AMERICAN DYESTUFF REPORTER

SAMPLE SWATCH QUARTERLY

"Circulated Everywhere Dyestuffs Are Used"

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Devoted to the practical application of dyestuffs in all industries; especially to textile chemistry—the science and practice of scouring, bleaching, dyeing and finishing.

NEW YORK, JULY 8, 1929

A Popular Lesson on the Chemistry of Aktivin

By DR. RICHARD FEIBELMANN

AKTIVIN is an organic chlorine compound. There are an enormous number of organic chlorine compounds, but Aktivin has a special position, as its chlorine atom is "available," which means that it can act as a bleaching agent. This circumstance is also for the layman easy to recognize by the characteristic odor, when such available chlorine comes in contact with the skin. Chlorine compounds, inorganic or organic ones, of which the chlorine is not available, do not produce this odor; their chlorine atom is "masked," and it can be recognized only by chemical reagents or deep destructive influences. The following examples may be mentioned:

INORGANIC	ORGANIC
Na-Cl Common Salt	$H\text{-}C = Cl_3$ Chloroform
Chlorine not available; does not smell chloreous, and does not act as a bleaching agent.	Chlorine not available; does not smell chloreous, and does not act as a bleaching agent.
Na-O-Cl Sod. Hypochlorite	$CH_3.C_6H_4.SO_2.N\begin{matrix}Cl\\Na\end{matrix}.3H_2O$ Aktivin
Chlorine is available; smells chloreous, and acts as a bleaching agent.	Chlorine is available; smells chloreous, and acts as a bleaching agent.

The appearance of Aktivin in the chemical consuming industries means a fundamental innovation. Aktivin is the only chemical of its kind with series of properties which are characteristic only for this single substance, although it has certain similarities with the old known inorganic compounds of available chlorine. Therefore it is no wonder that it is exposed to many misunderstandings and that it is often wrongly judged; for instance, that it is thought to be of the same quality as sodium hypochlorite or chloride of lime, although this is completely wrong. Often objections against Aktivin are heard which are founded on its chlorine content, and one erroneously attributes to it properties which it does not possess at all. It is therefore justifiable to give a popular explanation of the properties of this substance.

Man is conservative by nature. He compares new things with old ones, and often years or decades elapse before something new is known or understood in its new qualities, separated from old accustomed thoughts. A new thing requires a new, independent imagination. The new idea must be weaned from the prejudices which always are the children of former experiences, and this process of separation endures until the new has become old by the new experiences.

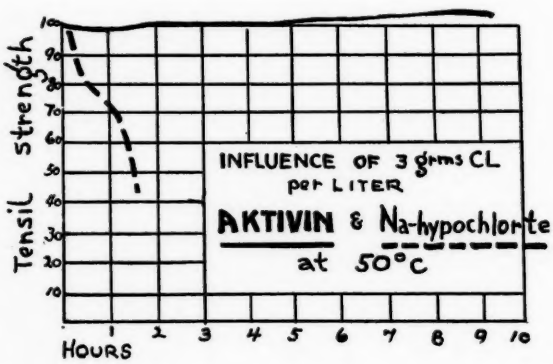
In considering the above-mentioned four formulas the fact is that in every one the chlorine is bound in a different manner—in the common salt the Cl is bound to Na (sodium, a metal); in chloroform, Cl is bound to C (carbon); in sodium hypochlorite, Cl is bound to O (oxygen), and in Aktivin, Cl is bound to N (nitrogen). Experiences show that the chlorine atoms, bound to metals or carbon, are not available—i. e., that they are not recognized instantly, and that they have not the properties and effects of "chlorine." Furthermore, experiences show that in all the cases in which Cl is bound to O, the chlorine is "available" and is easily recognized by its odor; also, by the action on the skin it shows the well-known properties of the available chlorine. Chloride of lime is to be put in this series. This compound is interesting inasmuch as, according to its formula, $Ca\begin{matrix}Cl\\O\text{-}Cl\end{matrix}$ it contains chlorine bound to a metal (calcium) as well as to oxygen. Therefore, only the latter is available, while the first one is not.

In cases where Cl is bound to N, it is noted that they have not such a definite position; while the Cl in Aktivin is available, this is not the case in sal ammoniac, $H_4 = N\text{-}Cl$ (ammonium chloride), in which it is as inactive as in common salt. The question whether the Cl in the N-Cl compounds is available depends upon the

other groups which are connected to N—i. e., the properties of Cl are influenced and determined by these other groups. In this statement we have the key for the explanation of the special position of Aktivin among the chlorine compounds. In this case the group $CH_3.C_6H_4.SO_2$ determines that the binding N-Cl is not as fast as in sal ammoniac, but, on the contrary, it is so loose that the Cl is available; but, as practical experiences show again, it is not as loose as in NaO CL. This means that the chlorine in Aktivin is naturally available, but in a much lesser degree than is the case with the old known active chlorine. Just as there are more or less aggressive acids or alkalies, there are also more or less aggressive bleaching agents. It is, therefore, absurd to say, "Aktivin contains chlorine, and is therefore injurious to the fiber." Past experiences have proven that cotton bags in which Aktivin had been stored for several years did not show any signs of deterioration.

The most valuable property of Aktivin is its stability conditioned by the character of its N-C binding, which is determined by the complete constitution. This stability is the cause of the harmlessness to the fiber and for the possibility of some applications of Aktivin for which other compounds with available chlorine cannot be used. On the contrary, the stability is also the reason why Aktivin cannot be used for some purposes for which only strong-acting compounds with very loose available chlorine are applicable; for instance, for the complete bleaching of cotton goods.

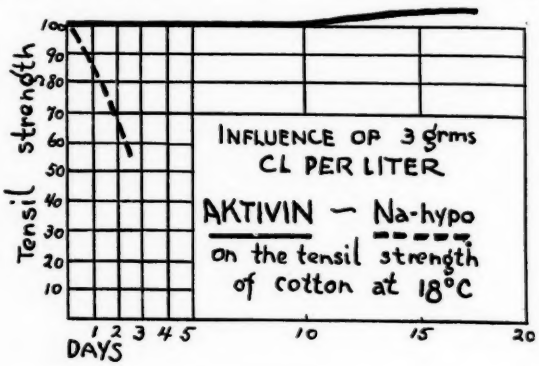
The more unstable a compound the greater is the tendency to attack the fiber. This is demonstrated in the following three graphs, which speak for themselves. The curves are based on series of trials in scientific institutes.



Further individualities of Aktivin are its complete solubility in powdered form and its practical neutrality. All other known compounds with available chlorine can only be prepared as a solution (sodium hypochlorite), or they are not completely soluble (chloride of lime); but all are strongly alkaline.

It is often asked, "What part has Aktivin in *starch solubilizing?*" "Is the starch solution prepared with Aktivin or Aktivin S really harmless for the goods, although Aktivin contains chlorine?" The answers are:

The solubilizing of starch by means of Aktivin is an oxidizing process—i. e., an action of oxygen. In this case the oxygen is supplied by Aktivin. You will note that it has been mentioned above as available chlorine, and not as available oxygen. The "available" chlorine does not really act as "chlorine" but as "oxygen." Available chlorine has only an apparent action and is easily recognized before the action, but not afterward. The oxygen



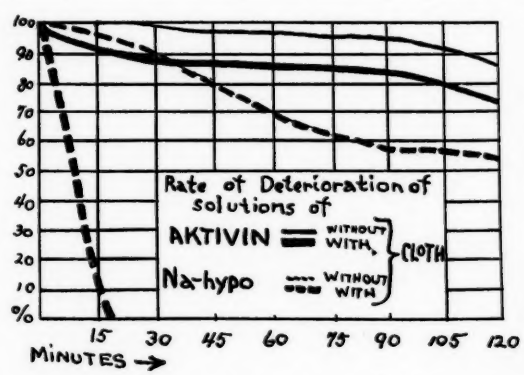
is produced by the transformation of the available chlorine into non-available chlorine—i. e., the atom available chlorine leaves its original place and gets in direct binding with the metal. This process is always accompanied by the development of oxygen:

$$\underset{\text{Sod. Hypochlorite}}{\text{Na-O-Cl}} \longrightarrow \underset{\text{Common Salt}}{\text{Na-Cl}} + \underset{\text{Oxygen}}{\text{O}}$$

In the case of Aktivin the oxygen is supplied by water (H_2O):

$$\text{Aktivin} \begin{cases} \text{Cl} \\ \text{Na} \end{cases} + \underset{\text{Water}}{H_2O} \longrightarrow \underset{\text{Common Salt}}{\text{Na-Cl}} + \underset{\text{Oxygen}}{\text{O}}$$

This developed oxygen executes the bleaching action of the hypochlorites and Aktivin, and also makes the starch soluble. In solubilizing the starch, Aktivin is, therefore, completely consumed, so that the solution does not contain Aktivin or available chlorine at all, which is completely transformed into the harmless common salt.



The size prepared by Aktivin is therefore exactly as indifferent as if no Aktivin would have been used, which should eliminate the doubts.

As we have seen, the effectiveness of Aktivin is

founded on the development of oxygen. The question is: "What difference is there between Aktivin and those compounds which supply oxygen without the interposition of available chlorine—i. e., the so-called 'oxygen bleaching agents,' hydrogen peroxide and its derivatives, sodium peroxide and sodium perborate?" In the principle there is the same chief difference as between Aktivin and the hypochlorites—i. e., the stability. The so-called oxygen preparations are not very stable, as they lose their available oxygen readily on heating, often already in storing; while Aktivin, as is shown in Fig. 1, loses only 10% of its available oxygen or chlorine after a two hours' boil. A further indifference is that sodium peroxide and perborate are alkaline and produce therefore a yellowish color in the starch solution. The ready loss of oxygen during heating causes uneven effects, while the stable Aktivin acts in a constant, reliable manner.

HOME ECONOMISTS REQUEST NATIONAL STANDARDS TO END SILK WEIGHTING CHAOS

Insist on More Consideration for the Consumer's Troubles

THE consumer is suffering from the failure of the silk industry to agree on a definite tin-weighting policy, and the industry cannot settle this problem satisfactorily until the consumer takes a hand. Impelled by this conviction the American Home Economics Association has just sent a formal request to the American Standards Association to call a representative national conference on standards for silk weighting.

The Association proposes that this conference, including delegates of manufacturers, dyers, retail stores, consumers and other interests affected, shall decide whether national standards for the determination of weighting in silk, and methods of labeling silk, shall be set up under the procedure provided by the American Standards Association. This procedure is now being used for the establishment of national standard specifications for sheets and sheeting, and blankets. The American Home Economics Association's request was indorsed by department stores, mail-order houses and advertising organizations.

It is pointed out that the question is of great importance to the consumer because silks weighted to excess, which is customary in both dress goods and ready-to-wear garments, deteriorate two or three times as rapidly under exposure to sunlight and perspiration as unadulterated silks. Water soluble weighting, which accounts for water spotting of silk and for serious injury to the appearance in dry cleaning or laundering, is also a common practice concerning which the consumer needs definite information.

The danger of misunderstandings in the present situation lies in the fact that three different methods are used to express the percentage of weighting of silk, and these methods give radically different results. One of the principal laboratories engaged in fabric testing uses all three methods in reporting weighting. Thus the same ratio of tin to silk in a finished fabric would be calculated as 60 per cent by one method and 100 per cent by another method.

Declares Overweighting Cheats Consumer

The request for a conference received by the American Standards Association states that "the homemaker is now in a hopeless position when attempting to choose silk. She may find that even before the garment is made the material is on the point of breaking because of the excess weighting it contains."

The request proposes that the conference consider the standardization of methods of determining weighting in silk and methods of labeling silk which will give the homemaker information about the weighting in the silk yard goods and silk garments which are offered for sale over the retail counter. "It should be noticed," Miss Ruth O'Brien, chairman of the American Home Economics Association's Committee on Commercial Standardization and Simplification, says, "that we are not asking that grades or classes of this merchandise be set up, but are requesting for the homemaker the opportunity to have specific information as to the amount of weighting contained in the silk fabrics which she may buy. Such problems as these must be solved before any satisfactory practices can be established in the trade or any useful information can be given to the consumer. Up to the present time the consumer's point of view has not been sought, nor given consideration by those attempting to find a solution for the problems involved."

One of the best known department store executives, in indorsing the request of the American Home Economics Association, said, "I think with you that it is a question which such organizations as yours should go into, and that there ought to be a hearing before some neutral body in which both sides of the question would be taken up."

A leader among advertising men also indorsed the request of the American Home Economics Association. "We believe," he declared, "that the right kind of advertising not only tells the truth about merchandise, but helps the buyer to buy intelligently. Because of this belief in advertising, which is fully serviceable to the consumer, the International Advertising Association would work with you wholeheartedly to help the consumer secure better silk fabrics, and a better understanding of all the goods which she buys."

This action of the American Home Economics Association is the latest move in a concerted effort to secure authoritative national standards prepared to guide American housewives in intelligently making their purchases of essential commodities.

It was said at the offices of the American Standards Association in New York that a representative confer-

ence of all vitally interested groups would be called as soon as the necessary arrangements can be made for the issuance of the invitations. Under the procedure of the American Standards Association, if the conference approves the request of the American Home Economics Association, a technical committee, including representatives of all of the major groups concerned with silk weighting will be formed to prepare the standards for the determination of the percentage of weighting in silk, and the methods of expressing and marking such percentages so that they may be generally understood by all concerned.

Text of Request for Conference

The text of the formal request to the American Standard Association follows:

The Committee of the American Home Economics Association concerned with commercial standardization and simplification presents to the American Standards Association a request on behalf of our organization that a conference be called of those concerned to consider the standardization of methods of determining weighting in silk and methods of labeling silk which will give the homemaker information about the weighting in the silk yardage and silk garments which are offered for sale over the retail counter.

At present the homemaker is in a helpless position when attempting to choose silk. Often the fabric, which she selects by the necessarily superficial methods available to her, is of little value. She may find that, even before the garment is made, the material is breaking because of the excess weighting it contains. We understand that some merchants, at regular intervals, check their silk yard goods by a tearing test and immediately advertise special sales of any material showing deterioration. The consumer is, of course, unaware of this weakening when she buys those fabrics.

Dissatisfaction due to this situation is not confined to consumers, but is evidenced by numerous controversies among and between trades as to what should be done about silk weighting. Complaints have recently been presented to the Federal Trade Commission and the National Better Business Bureau by groups interested. The Silk Association of America has proposed a program which sets up the maximum amounts of weighting to be permitted in various kinds of fabrics. This has been accepted by some trade groups and strongly opposed by others. As a result of this opposition, it seems that the maximum weighting, as it was first proposed, may be increased, although in our opinion as consumers, the amounts first suggested were as much as should be used. If maximums for weighting were accepted by the trade, the tendency would be for all silk to be given the maximum weighting, and the consumer who desires pure silk or silk with less weighting would find great difficulty in obtaining it.

We believe, therefore, that the program of the Silk Association of America does not promise relief but would result in lowering rather than raising the quality of silk. We also believe that a matter of this kind cannot wisely be left to a single group with a basic commercial interest nor should its control be regulated alone by a governmental body. Such regulation is necessarily slow and the methods of procedure and functioning more formal and inflexible than is desirable. We believe it would be more satisfactory to have all groups concerned, under the auspices of the American Standards Association, agree upon desirable practices and methods of giving reliable information concerning silk fabrics to the consumer. Up to the present time, the consumer's point of view has not been sought nor given consideration by those attempting to find a solution for the problems involved.

It should be noticed that we are not asking that grades or classes of this merchandise be set up, but are requesting for the homemaker the opportunity to have specific information as to the amount of weighting contained in the silk fabrics which she may buy. It should be noticed that there is at present hopeless confusion concerning the methods to be used in determining weighting and in expressing the amount present. Such problems as these must be solved before any satisfactory practices can be established in the trade or any useful information can be given to the consumer.

For these reasons, therefore, we submit the above request.

WAY FOUND TO TEST STIFFENING OF FABRIC

Method Is Said to Be Useful for Various Industries

THE comparative value of potato wheat, corn and rice starches for stiffening fabrics has been given intensive study in the textile laboratory of the Bureau of Home Economics, Department of Agriculture In addition, a quantitative method and apparatus for measuring the stiffness of sized fabrics has been devised by Esther C. Peterson and Tobiaz Dantzig, it was added.

The full text of the statement follows:

"Heretofore only qualitative methods of showing differences in fabric stiffness had been developed, and oftentimes the stiffness was indicated as part of the 'feel,' 'handle,' or some such vague term common in mill and laundry practice. The new method originated by a textile chemist and mathematician in collaboration, therefore, marks an advance in the scientific study of fabric sizing. It is also predicted that manufacturers of paper, celluloid and other commodities will find this method of equal value in measuring accurately the stiffness of their commodities.

"The study of starches is being continued by the Bureau to determine the value of dasheens and other agricultural products as sources of sizing materials for use in the manufacture and laundering of fabrics.

COST SYSTEM FOR HOSIERY MANUFACTURERS TO BE PUBLISHED

"The Full Fashioned Hosiery Industry," the first detailed presentation of a uniform cost system available to manufacturers of full-fashioned hosiery in this or any other country, will be published during August.

John Nash McCullaugh, managing director of the National Association of Hosiery and Underwear Manufacturers, is the author of this book. He has been working on it for over a year, and has included in its 160 pages numerous illustrations explaining and simplifying the text.

The book outlines in detail a theoretically perfect cost system, adaptable for both large and small mills. This system, the author states, is subject to variation to meet the needs of individual mills.

An interesting feature of the book is the reproduction of a number of charts showing the romantic growth of the full-fashioned industry during the last few years.

Mr. McCullaugh announces that one copy of the book will be sent gratis to every member of the National Association of Hosiery and Underwear Manufacturers requesting it.

"The Full Fashioned Hosiery Industry" will be published by the Howes Publishing Company, 90 William Street, New York, and will be sold exclusively by this company. It will be priced at $10.00 per copy.

EDISON RESEARCH FELLOWSHIP ESTABLISHED

In honor of Thomas A. Edison and in commemoration of the fiftieth anniversary of his incandescent lamp, an Edison Fellowship for Research in the General Electric research laboratory at Schenectady, N. Y., has been established. Its object is to help determine the fitness of the Fellow for industrial or scientific research by arranging for a year's research in that laboratory. The opportunity will be given to the selected candidate who has adequate training and who has done sufficient original work to have indicated an aptitude for research. The year's fellowship carries a grant of $3,000.

The selection from applicants will be made by the National Research Council, with the advice of the director of research of the General Electric Company. The committee includes: Dr. George K. Burgess, director of the U. S. Bureau of Standards and chairman of the National Research Council, chairman of the committee: Dayton C. Miller, professor of physics of the Case School of Applied Science and chairman of the division of physical sciences of the National Research Council; James E. Mills, chief of the research division of Edgewood Arsenal and chairman of the division of chemistry of the National Research Council; and A. E. Kennelly, professor of electrical engineering at Harvard University. Dr. Willis R. Whitney, vice-president and director of the research laboratory of the General Electric Company, represents that company.

The choice of research work will be influenced by the preference of the individual, and may be the continuation of studies already begun at college if suitable laboratory facilities are available, or the Fellow may work on new or specially selected projects, either independently or in co-operation with others.

Any research man wishing to apply for the fellowship and who is able to begin a year's work this fall (1929) should send to the Director of the Research Laboratory, General Electric Company, Schenectady, N. Y., before July 4, relevant information about his training and a recent photograph, and should arrange for a separate letter of recommendation to be forwarded by someone with whom he has done original scientific work.

TEXTILE COLOR CARD ASSOCIATION AWARDS SCHOLARSHIPS

At the commencement exercises of the New York Textile High School, held the evening of June 26, Anna Lanman, a member of the graduating class, was awarded the scholarship established at that school by the Textile Color Card Association. The presentation was made by Edward S. Johnson, of James G. Johnson & Co., silk manufacturers, who is president of the Textile Color Card Association.

Textile Color Card Association scholarships were previously awarded to Margaret Grey Scadding of the Lowell Textile Institute, and to Richard Kerr Palmer of the Philadelphia Textile School, at the commencement exercises of these schools held the first week in June.

The three textile schools mentioned above are the first to benefit from the scholarships which the association has established for the first time this year. The awards, amounting in all to approximating $1,000, are given to these students because of their exceptionally high rating in color appreciation and application. The recipients will be present and publicly commended at the next annual meeting of the Textile Color Card Association in April.

The terms and purposes of the scholarships were worked out according to individual plans with the principals of each school. In the case of the New York Textile High School, the award will take the form of a post-graduate course of one year in that school. The winner will receive the amount of the scholarship in two payments, which will assist toward the support of the student during one year's post-graduate study and research in color as applied to textile designing.

In the case of the Lowell Textile Institute and the Philadelphia Textile School, where the course is three years, the awards are given at the end of the students'

freshman year. The tuitions of these students will be paid by the Textile Color Card Association for the two succeeding years. If the high standard of scholarship set by the school is not maintained, then the award goes to the student with the next highest rating.

Each student will be required to prepare a thesis on color, which will become the property of the Textile Color Card Association for printing and distribution as may be determined by the association. Full credit will be given the winners of the scholarships and the school.

SUN TONES FEATURED IN FALL HOSIERY COLORS

Twelve colors, comprising eight new shades and four repeated from the spring season, are shown on the 1929 Fall Hosiery Card which the Textile Color Card Association has just released to its members. Advance swatches of these colors were sent out several weeks ago.

The continued fashion importance of the sun tones is stressed by the repetition of such widely accepted shades as Suntan and Sunbronze, as well as by the introduction of new skin tones reflecting the suntan influence.

Of special style significance in this group is a burnished shade termed Onionskin. It is so named because it is the exact shade of the popular French wine called "pelure d'oignon." It is particularly suggested as a complement to shoes in the chocolate tone, worn with a costume of the same deep brown shade.

Because of the increased attention accorded the ensemble theme, it was explained that the new hosiery colors were carefully chosen in their relation to the fashionable shades in costumes, millinery and shoes for the coming season. Suntan and darker Sunbronze, for example, are mentioned as a fitting complement to a costume in one of the rich darker green tones, requiring shoes of Autumn Green.

Reflecting further harmony between hosiery and shoes is a medium brown called Almora. This is the darkest of the hosiery shades on the new card, and is suggested to accompany shoes of Sierra Brown or Prado Brown.

A dark tan shade more subdued in its toning is Sable. In addition to being a tone for the more neutral brown costume, it will harmonize well with rich sable furs.

TESTS DETERMINE BEHAVIOR OF DYES IN DRY CLEANING

Tables summarizing the behavior of dyes in dry cleaning will soon be published, it was announced on June 24 by the Department of Commerce. Such data have not been available heretofore.

The statement follows in full text:

"A number of representative dyestuffs on wool, silk, cotton, rayon and union fabrics were subjected to two tests at the Bureau of Standards. In the first a moisture-free solvent was used and in the second the solvent contained 0.1 per cent free moisture and 0.01 per cent alkali.

"The apparatus used in making the tests was designed as a convenient substitute for a commercial dry-cleaning machine and will be fully described. The results of this investigation will be published in a forthcoming number of the Bureau of Standards Journal of Research."

PLAN ACTIVE PROGRAM FOR SOUTHERN TEXTILE SHOW

One hundred and twenty-five applications for space have been received for the Ninth Southern Textile Exposition, to be held October 20 to 25, 1930, in Textile Hall.

The entertainment of visitors during show week will be in the hands of a Chamber of Commerce committee, and will include a dinner, several luncheons, an exposition ball and a number of other interesting functions. The program is being developed by the president and secretary of the corporation. A questionnaire will be sent out in a few days to exhibitors covering several proposed changes in the regulations.

NEW CIBANONE COLORS ANNOUNCED

An attractive sample card has been issued by the Society of Chemical Industry to display dyeings of several new Cibanone colors. It is designated as Sample Card 727, entitled "Cibanone Dark Blue BO, MB, MBA, Cibanone Black BF," and shows the use of these dyestuffs for deep marine blue and black shades.

These colors are dissolved either through the stock-vat procedure or directly in the dye vat. For each liter dye bath, according to the depth of the color, it is necessary to have 16-25 com. soda lye and 4-8 grams hydrosulphite concentrated powder. When coloring with Cibanone Black BF an addition of 20-30 grams of sodium chloride for each liter of dye liquor is made so that the bath may be used to its fullest extent. After dyeing, the rinsing, scouring and soaping follow.

According to the description, these dyes produce strong, bright marine-blue shades on cotton piece or yarn, which may be shaded with Cibanone Blue G, according to wishes. These products, it is further stated, are suitable for bleaching in the piece.

A NEW PYROGENE COLOR

A circular recently issued by the Society of Chemical Industry of Basle and distributed in this country by the Ciba Company, Inc., of New York, describes the dyeing properties of Pyrogene Pure Blue 2RL. This new shade dyes a considerably more reddish hue than the previous Pyrogene Pure Blue brands. As usual, the dyeing is done from an alkaline, sodium sulphide bath. The material is then squeezed out and oxidized.

Its fastness to water, perspiration and cross-dye is emphasized in the circular, which also states that its solubility and its dischargeability with chlorate are both good features.

Proceedings of the American Association of Textile Chemists and Colorists

The American Association of Textile Chemists and Colorists

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Newport Chemical Works, Passaic, N. J.

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Lowell Textile Institute, Lowell, Mass.

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Clarence Wille, Secretary, Burson Knitting Company, Rockford, Ill.

Lowell Textile Junior Section—
A. Kempton Haynes, Chairman; Walter C. Lindsly, Secretary

FIFTY-NINTH COUNCIL MEETING

June 13, 1929

THE fifty-ninth council meeting was held at the Engineers' Club, Boston, Mass., at 2 o'clock, Thursday afternoon, June 13.

The following officers and councilors were present: President, E. H. Killheffer; Vice-President, W. S. Williams; Vice-President, P. J. Wood; Councilors, Hugh Christison, Walter M. Scott, George A. Moran, Ralph F. Culver, William R. Moorhouse; Councilors ex-officio, Wm. H. Cady, chairman North New England Section; A. M. Burt, chairman, Philadelphia Section; Prof. L. A. Olney, chairman Research Committee; Secretary, Alex. Morrison.

The reading of the Secretary's report of the fifty-eighth council meeting was waived as it had been published in the Proceedings, AMERICAN DYESTUFF REPORTER of April 29.

The financial report of the Secretary was read as follows and was accepted:

Financial Report of Secretary, June 13, 1929

Cash on hand 4/12/29	$164.00
Receipts 4/12 to 6/13:	
1929 Dues (80½ at $5.00)	402.50
1928 Dues (two at $5.00)	10.00
1927 Dues (one at $5.00)	5.00
Applications (43 at $5.00)	215.00
4/13—Ontario Research Foundation (Reporters)	1.00
5/3 —Howes Publishing Co. (Reporters)	3.75
5/20—City of Los Angeles (Reporters)	4.00
6/12—Howes Publishing Co. (Reporters)	1.25
Two pins	3.00
	$809.50

Disbursements

4/26/29—To Treasurer	$200.00
5/ 3/29—To Treasurer	200.00
5/29/29—To Treasurer	200.00
Bank Exchange charge on one check	.25
Cash on hand, Andover National Bank	209.25
	$809.50

Accounts Receivable

6/7—Howes Publishing Co. (five Reporters at 25 cents)	$1.25

The Treasurer's Report was read as follows and accepted:

Financial Report of Treasurer

November 1, 1928, to May 31, 1929

General Fund:	
Receipts	$6,217.81
Expenses	4,499.97
	1,717.84
Balance from 1928	3,889.85
On hand 5/31/29	5,607.69
Research Fund:	
Receipts	$2,265.00
Expenses	2,118.59
	146.41
Balance from 1928	3,238.39
On hand 5/31/29	3,384.80
Grand total on hand 5/31/29	$8,992.49

Note.—$6,000 of this deposited in savings account.

The following were elected to membership:

Active Members

Anderson, Edward G., bleacher, dyer and finisher, Zion Lace Industries, Zion, Ill.; 415 Fourth Street, Waukegan, Ill.

Berry, Stephen A., dyer, Olson Rug Company, 32 South Laflin Street, Chicago, Ill.; 1533 West Madison Street, Chicago, Ill.

Boler, William J., Jr., textile colorist, Acme Finishing Company, 185 Front Street, Pawtucket, R. I. 360 Brook Street, Pawtucket, R. I.

Bragg, C. C., in charge of experimental laboratory, Wayne Knitting Mill, Knitters Avenue, Fort Wayne, Ind.; 1921 West Main Street, Fort Wayne, Ind.

Britt, Harry H., dyer, Louis Terry Corporation, 500 South Throop Street, Chicago, Ill.; 425 Roscoe Street, Chicago, Ill.

Burke, George E., superintendent, Real Silk Hosiery Mills, Indianapolis, Ind.; Indianapolis Athletic Club, Indianapolis, Ind.

Butler, William H., demonstrating salesman, Newport Chemical Works, 68 Devonshire Street, Boston, Mass.

Clasgens, Vincent P., chemist and dyer, J. & H. Clasgens Company, New Richmond, Ohio; 302 Washington Street, New Richmond, Ohio.

Clement, D. S., chemist, Nashua Manufacturing Company, Nashua, N. H.

Dempsey, Norman P., dyer, Ellis Mills, Inc., Monson, Mass.

Donahue, Edwin L., superintendent, Consolidated Piece Dye Works, Hazel Street, Paterson, N. J.; Post Avenue, Hawthorne, N. J.

Fox, Lester R., salesman, Commonwealth Color & Chemical Company, 644 Diversey Parkway, Chicago, Ill.

Greer, John H., chemist and colorist, Monroe Chemical Company, Quincy, Ill.

Grotelueschen, Nestor, dyeing superintendent, Holeproof Hosiery Company, Milwaukee, Wis.; 1019 Fifty-fourth Street, Milwaukee, Wis.

Hannah, Thomas E., chemist and colorist, Pepperell Manufacturing Company, Biddeford, Me.; 49 Elm Street, Saco, Me.

Harkavy, Samuel S., color chemist and colorist, Heller & Merz Company, 505 Hudson Street, New York, N. Y.; 100 Northern Avenue, New York, N. Y.

Heritier, Louis L., tinweighter, Consolidated Piece Dye Works, Hazel Street, Clifton, N. J.; R. F. D. No. 2, Box 123, Ridgewood, N. J.

Hiller, Lee Roy, dyer, American Textile Dye Works, 1710 Third Street, Milwauke, Wis.; 241 Knapp Street, Milwaukee, Wis.

Hoehn, Jr., Louis, dyer, Vassar Swiss Underwear Company, Chicago, Ill.; 2545 Diversey Parkway, Chicago, Ill.

Hoppe, Clemens F., colorist, Oriental Silk Printing Company, Haledon, N. J.; Gionti Place, North Haledon, N. J.

Howells, Lloyd T., chief chemist, Cowles Detergent Company, 7016 Euclid Avenue, Cleveland, Ohio; 3638 Glencairn Road, Shaker Heights, Ohio.

Klein, M. H., dyestuff salesman-demonstrator, Newport Chemical Works, 605 West Washington Boulevard, Chicago, Ill.

Kolumban, Alexander de, chief chemist, Columbia Mills, Inc., Minetto, N. Y. P. O. Box 12, Minetto, N. Y.

Latham, H. Thompson, dyestuffs sales and demonstration, E. I. du Pont de Nemours & Co., 1114-7 South Dearborn Street, Chicago, Ill.

Loescher, Oscar P., dyer, Cooper Wells & Co., St. Joseph, Mich.; P. O. Box 223, St. Joseph, Mich.

May, William, dyestuffs salesman and demonstrator, Senco Color & Chemical Company, 287 Broadway, New York, N. Y.; 1142 East Twenty-eighth Street, Brooklyn, N. Y.

McGee, James E., assistant superintendent, Paterson Mills Company, Inc., Rosemary, N. C.

McKenzie, A. H., overseer of dyeing, Hanover Woolen Manufacturing Company, Hanover, Ill.; P. O. Box 80, Hanover, Ill.

Pickup, John H., bleacher, finisher and dyer, Carolina Cotton & Woolen Company, Fieldale, Va.; Box 226, Fieldale, Va.

Pickup, Thomas W., color mixer, Hartsville Print & Dye Works, Hartsville, S. C.; 1114 Fifth Street, Hartsville, S. C.

Ray, Delbert E., overseer of dyeing, Massachusetts Mohair Plush Company, 122 Western Avenue, Lowell, Mass.; 34 West Forrest Street, Lowell, Mass.

Remington, John M., boss dyer, the Everwear Hosiery Company, 410 Tenth Street, Milwaukee, Wis.; 1239 Thirty-sixth Street, Milwaukee, Wis.

Rollins, Henry E., superintendent of dyeing, Clifton Yarn Mills, Conshohocken, Pa.; 324 West Tenth Avenue, Conshohocken, Pa.

Schaeffer, J. G., technical and textile representative, J. B. Ford Company, Wyandotte, Mich.; 609 Kingston Avenue, Charlotte, N. C.

Schlayer, Fred, dyestuff salesman and demonstrator, Progressive Color & Chemical Company, 25 Howard Street, New York, N. Y.; 8833 Eighty-first Avenue, Glendale, L. I., N. Y.

Schweibert, Raymond H., salesman-demonstrator, Geigy Company, Inc., New York, N. Y.

Sharman, Bert H., salesman-demonstrator, Nyanza Color & Chemical Company, Inc.; 549 West Randolph Street, Chicago, Ill.

Smith, Elmer F., manager, American Aniline Products Company, 1818 South Clark Street, Chicago, Ill.

Stahl, Wm. F., manager, Fibre Dyeing Company, 914 West North Avenue, Chicago, Ill.; 699 Sheridan Road, Evanston, Ill.

Stamm, Carl, dyer and chemist, Cramerton Mills, Cramerton, N. C.; Camerton Hotel, Cramerton, N. C.

Stronach, Irving N., dyer, Hampton Company, Easthampton, Mass.; 50 Dryads Green, Northampton, Mass.

Tainsh, Alexander C., Jr., salesman, John Campbell & Co., 78 Fountain Street, Providence, R. I.; 24 Ray Steet, Providence, R. I.

Thorpe, Hugh M., assistant dyer, Real Silk Hosiery Mills, Indianapolis, Ind.; 776 Dequincy Street, Indianapolis, Ind.

Wainwright, Charles B., chemist, U. S. Finishing Company, Fifth Street, Norwich, Conn.

Wentz, William M., chief dye tester, The Newport Company, P. O. Box M, South Milwaukee, Wis.; 77 Estes Street, Milwaukee, Wis.

Wieland, Herbert E., assistant chemist, Ayer Mills, Lawrence, Mass.

Worcester, Samuel T., Western sales manager, Chemical & Dye Corporation, Springfield, N. J.; 5437 Gladys Avenue, Chicago, Ill.

Youngblood, J. M., overseer of dyeing, Griffin Manufacturing Company, Griffin, Ga.; Box 47, Griffin, Ga.

Zwicky, Rudolph, president and manager, Helam Chemical Company, Inc., 7339 Coles Avenue, Chicago, Ill.

Junior Members

Barrett, Edward C., director of merchandise, Testing Laboratory, Abraham & Straus, Inc., Brooklyn, N. Y.

Brewer, Robert W., salesman and demonstrator, Liberty By-Products Works, Inc., 372 Main Street, Belleville, N. J.; 45 River Drive, Passaic, N. J.

Forney, Charles D., Jr., student, North Carolina State College, Raleigh, N. C.; Lawndale, N. C.

Glickman, Bernhardt B., dyer, Ziskind Company, 711 E. 140th Street, New York, N. Y.

Hazlewood, Gordon C., foreman of dyehouse, Franklin Rayon Corporation, 86 Crary Street, Providence, R. I.

Loughlin, K. C., student, North Carolina State College Textile School, West Raleigh, N. C.; Box 5394, West Raleigh, N. C.

Oberholtzer, Carl, student, Philadelphia Textile School, Hamburg, Pa.

Otto, Frederick E., textile chemist, Gaede Silk Dyeing Company, Paterson, N. J.; 107 Dayton Avenue, Passaic, N. J.

Perkins, J. Ralph, assistant to dyer, The Hygienol Company, 73 Crescent Avenue, New Rochelle, N. Y.; 21 Marvin Place, New Rochelle, N. Y.

Waid, Stanley B., boss dyer, F. Y. Kitzmiller Hosiery Company, Fourth and Elm Streets, Reading, Pa.; Reiffton, Berks County, Pa.

Associate Members

Houston, J. W., New England sales manager, General Chemical Company, Hospital Trust Building, Providence, R. I.; P. O. Box 1334, Providence, R. I.

Keach, William W., salesman and demonstrator, E. I. du Pont de Nemours & Co., Inc., 709 Hospital Trust Building, Providence, R. I.; 20 Creighton Street, Providence, R. I.

Ziskind, Samuel, general manager, The Ziskind Company, 711 East 140th Street, New York, N. Y.

Three applications were turned back to the Secretary for more information.

It was voted to confirm the reinstatement of Albert S. Jones and Harry F. Finlay and to transfer E. V. Steele from Junior to Active membership.

The matter of delinquents was taken up and according to Article VII of the Constitution the following, who according to the available records of the Secretary, have not paid their 1929 dues, are dropped from membership. It was suggested that this list be published with the idea in mind that if any whose names are on it, have not by chance received their March 1 notice, or have not been notified by the local Secretary, they could send in their dues at once and be reinstated without losing any copies of the REPORTER.

Active Members

Bernard Borrmann	James S. Massarene
K. E. Buettner	Wm. R. McIntyre
Harry Clapham	J. M. Newsome
Thos. B. Clendinning	Charles A. Rothe
Henry B. Constable	H. F. Ruck
J. C. H. Dempsey	Arthur L. Scheren
Pasquale P. De Nuccio	Edwin C. Scott
Wm. G. Dickerson	Herman Seydel
B. J. Dobbins	Wilfred F. Smith
Louis L. Fagnoni	Roy H. Souther
W. A. Farlow	Henry H. Stafford
Israel Gerber	Oscar C. Taylor
Wm. Goldsmith, Jr.	Marcel J. Toupense
Geo. L. Hayes	Thos. J. Turner
Albert E. Koehler	Harry E. Waldren
Ernest J. Lefort	Fred W. Whittaker
V. D. Le Portier	

Junior Members

Richard J. Andreoli	I. D. Robertson, Jr.
Robert E. Bannister	Karl H. Schmatzler
Paul L. Fasig	Robert H. Smith
Gilbert Hamilton	Walter C. Smith
Philip S. Johnson	Albert H. Spurr
Samuel Mazer	William A. Stewart
Samuel Meeker	Gerard Tanquay
Frank McKinnes	Herbert M. Tickle
Harold E. McNab	Frederic C. Walsh
Francis Parkman	

A communication from A. P. Howes, of the Howes Publishing Company, in regard to the mailing list being handled by the Secretary instead of the Howes Publishing Company, was discussed, and it was voted that the Secretary make the necessary arrangements with the Howes Publishing Company, and the mailing house, and take this matter over for a trial. It was voted to notify the members of this change through constant publication of a notice to members to keep the Secretary informed of address changes.

A letter from Dr. Himebaugh was read by the President, in which Dr. Himebaugh agreed not to attempt to take out patents, etc., on the Launder-Ometer and parts thereof in view of the change the Association had made in name plate.

It was voted that the President should renew negotiation with the Atlas Electric Devices Company in regard to Launder-Ometer contract.

A very lengthy discussion of the next Annual Meeting program followed, including subjects of papers and speakers and arrangement of group meetings, etc. It was voted that the technical program be left with the executive officers.

The Council Meeting adjourned at 4.10 p. m. until some time next September.

ALEX. MORRISON, *Secretary.*

COMMUNICATION

The Proposed Textile Research Laboratory

May 21, 1929.

PERHAPS I should not enter this fray, because I am on the side line of the textile industry. However, since interest and discussion of the question by members of the A. A. T. C. C. have been invited, I will give my viewpoint as a side-line observer.

I have read the communication of Professor Mullin and the reply of our President. I heartily agree with both.

There is no doubt that it is not the function of an organization of our kind to maintain a consulting or even a research laboratory. Those factors in the textile field who appreciate the value of research maintain laboratories of their own and are spending considerable money annually in solving their own problems.

These, of course, publish what results they see fit, and keep secret all else. Those who who have no laboratories should be educated to that point.

It certainly would be a boon to the industry if a plan could be devised for the study of the various problems which now baffle us, and to have the result of such investigation made common knowledge. A number of trade organizations are doing this, to wit: National Laundryowners' Association, National Can-

ners' Association, Copper Research Association and numerous others.

However, as Dr. Killheffer stated, since the project of a commercial laboratory has been definitely abandoned, this phase needs no further discussion.

We all agree that much research is needed in the industry; not only fundamentally, for from my own contacts with the textile industry I know that a good deal of scientific knowledge is lacking in the everyday operations. I have a constant flood of questions coming into my laboratory for information on this, that and the other in connection with the application of soap, oils and detergents.

Our greatest mission is to teach the industry a greater appreciation of the value of the chemist. Every fair-sized mill ought to have a chemist in its employ, right on the spot. A chemist, if he is worthy of his hire, will certainly be an asset to the business.

The trouble with many mills is that they consider the chemist and the laboratory an expense. Someone said that the laboratory is as necessary as the power house.

The American Institute of Chemists is trying to perform the work of teaching the public a better appreciation of the chemist's work, and it behooves all of us to put our shoulders to the wheel and help along this good movement.

With more general appreciation of the chemist will come more research laboratories, more widespread employment for chemist, physicist and allied scientist, and greater rewards will surely follow.

I believe that is really what Professor Mullin meant to bring out in his letter published May 13. I do not think he advocates a trade union, nor does he want Europe to do all the research.

I know that he would like to see bigger and better laboratories throughout our own country, for it is evident that he has at heart the interest of the chemist as well as our country's welfare and that of the American textile industry.

(Signed) BENJAMIN LEVITT,
Chief Chemist, Chas. W. Young & Co.

SPRING MEETING OF THE MID-WEST SECTION

THE spring meeting of the Mid-West Section was held at the Hotel Bismarck, Chicago, on the evening of May 25. About seventy members and guests attended. Carl E. Bick presided as chairman and introduced the first speaker of the evening, Phillip H. Stott, of the Newport Chemical Works, Inc., Passaic, N. J., who delivered an extremely interesting paper entitled "The Increasing Importance of Vat Colors, and Some Methods of Application." Following the discussion on this paper Clarence Wille presented a second paper on the subject of silk hosiery dyeing.

The paper by Mr. Stott is published herewith.

The Increasing Importance of Vat Colors, and Some Methods of Application

By PHILLIP H. STOTT
Newport Chemical Works, Inc.

IN this age of specialization, the demand for products as near perfection as possible is naturally increasing. It is difficult to point to any commodity which does not exhibit a greater value than the same commodity a few years ago. As an illustration, it is now possible to purchase more automobile per dollar than the most sanguine manufacturer would have regarded as possible when automobiles were first introduced to the public. The manufacturer's specifications for the mechanical part of the automobile, as well as the ornamental part, have been improved to meet the public demand and to give the manufacturer who is progressive enough to be original, an argument with the public as to why the public should prefer his product to his competitor's. On every hand we see evidence of the newer and more novel products supplanting the old, the use of oil burners for heating purposes, automatic refrigerators for cooling purposes, increasing uses for electricity, and all the one hundred and one things which go hand in hand with the development of the various sciences. We are living in a progressive age and particularly in our own country do we increasingly find that the best is not good enough.

The textile industry is no exception to this progressive spirit. The public during the past decade has gradually become accustomed to a greater variety of fabrics, both dyed and printed, than ever has been offered before. The number of novel effects made possible by the development of the rayon industry has been tremendously increased. With the increase in these fabrics has come the demand for high quality merchandise, not only in the quality of the fabric itself, but also in the color of the fabric. The modern housewife demands that her prints can go to the laundry and still be returned to her in something like their original condition. The automobile manufacturer demands that the cloth used for the upholstering of his car shall withstand the action of sunlight, water spotting and shall not rub off on milady's summer dress. The consumer of awning fabrics demands from the manufacturer that the awning on his house or on his beach umbrella shall not only have bright colors but colors which will retain their brightness throughout at least one season.

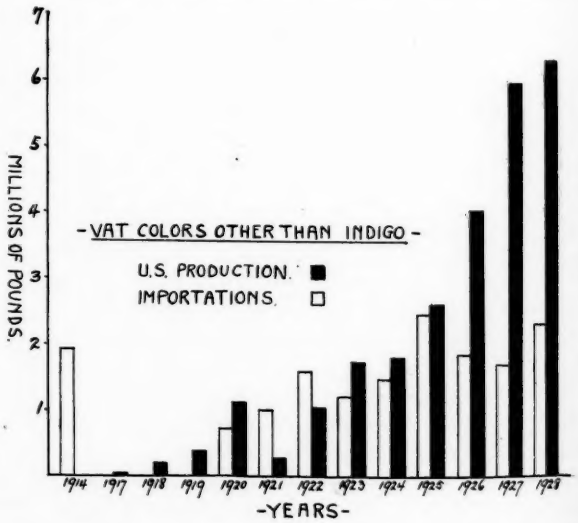
These are but a few instances of very many more demands which are being made upon the manufacturer of textiles. The manufacturer is meeting the demand made upon his resources in almost every instance. He is equipping his technical staff with men whose scientific training enables them to make correct and accurate judgments of quality. Numerous associations have been formed and are still being formed whereby a group of manufacturers of similar products can adopt certain specifications to which their goods must conform before being placed in the hands of the public. Such goods are guaranteed in some cases and their quality indicated by suitable labeling. Department stores are instituting their own testing laboratories to satisfy themselves that the goods which they are retailing are satisfactory as to quality and are establishing their own specifications so that the purchasing public will know what it is buying before the goods are sold. Our own association, by virtue of close co-operation with textile manufacturers and scientists has adopted and is still working on groups of fastness tests on all kinds of textile fabrics. Many of these have already, as you know, been published in the Year Book of the Association and represent the unfailing effort and thought of some of the best minds in the country on this phase of their work. Naturally, the textile manufacturer finds himself at once dependent upon the ability of the country's chemists to provide him with the dyestuffs necessary to withstand the demands for fastness made upon him. It probably is not necessary for me to state that American manufacturers of dyestuffs have responded to these demands in wonderful fashion by making available for the textile and dyeing industries a very comprehensive range of so-called *vat colors*, which, of course, as a class are the fastest dyestuffs science has produced.

It would, of course, be ridiculous in the extreme to suppose that all fabrics manufactured should have extreme fastness to various destroying elements. No textile man in his right mind would think of dyeing cotton yarn which was to be used for wrapping cord with anything but cheap colors, because the life of the goods would not warrant the expense, nor would any good purpose be served by doing this. Similarly, there is no point in using dyestuffs of extreme fastness to chlorine, for example, for goods which in the course of their lifetime will never be bleached, but where fastness specifications demand vat colors, they are available in ever-increasing numbers.

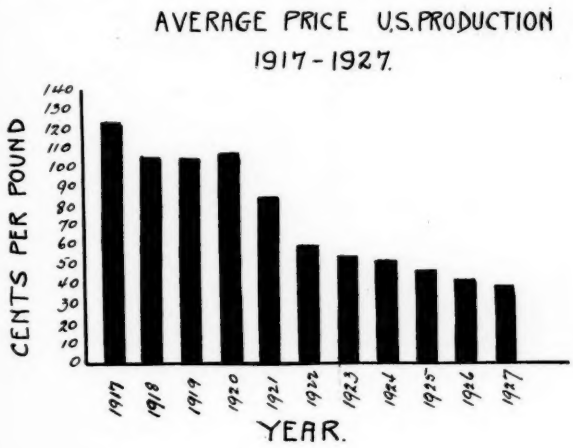
Development of the American Dye Industry

I would like to briefly trace the history of vat colors of American manufacture. The year 1914 saw the outbreak of the Great War. At that time vat colors, as we understand them to-day, had only been generally on the market, and in somewhat limited number for about twelve years. In other words, it is only a little over a quarter of a century ago since the first vat dyestuff was commercially prepared. As soon as the available stocks of dyestuff in this country in 1914 were exhausted, the textile industry was confronted with the fact that only a very limited number and quantity of colors were available for their use, and certainly no vat colors. Obviously, the first step of the American dyestuff manufacturer was to establish his industry by making the dyestuffs which permitted of easiest solution from the standpoint of scientific research. One would not expect a mechanic to suddenly decide that he was going to make an automobile, and then have him produce a car of high power and beautiful lines, such as are common enough to-day. It has to be only by a painful process of development and investigation that such a degree of perfection is obtained. The same thing is true of any scientific development.

At the outset, therefore, of the scientific development of the dyestuff industry in this country, the first efforts were directed toward increasing the production of direct, acid and sulphur colors which had previously been made on a more or less limited scale. This was the obvious development, as it immediately supplied the consuming trade with colors which were important as to bulk and at the same time utilized the raw materials which were available at that time. This permitted of a solidification of resources and a building up of research organizations to face the larger problems necessary to produce vat colors. There are three basic raw materials which enter into the manu-



facture of dyestuffs. These are benzol, naphthalene and anthracene, all of which are obtained from coal tar. Benzol and naphthalene are the basic raw materials for the direct, acid and sulphur colors, while anthracene is the basic raw material for vat colors. Very little was known in this country about the chemistry of anthracene and anthraquinone, which is prepared from it by oxidation and which is the starting or base intermediate for vat colors of the anthra-



quinone series, to which belong Blue G C D, Yellow G, etc. Not a great deal of information regarding the chemistry of anthraquinone could be obtained from the German patent literature, and being a very complex chemical problem naturally a great deal of time was required to comprehensively undertake the research work.

Perhaps one of the biggest stumbling blocks towards the economic production of vat colors in this country was the lack of the basic raw material, anthracene, and also the fact that there was no American production of pyridine, which is the extracting solvent for anthracene. In 1917, however, it was discovered that naphthalene, of which there was a sufficient supply, could be commercially converted into anthraquinone by a series of chemical processes, and upon this brilliant piece of research work by American chemists probably depends the development of the American vat color industry. Once having available the basic intermediate, the problems of the dyestuffs themselves confronted our chemists. It was found that almost revolutionary developments in chemical engineering had to be made in order to get apparatus which would stand the chemical reactions necessary for the manufacture of the colors. However, in 1919 vat colors began to appear on the market, and since that time there has been a gradual increase in their number, and an improvement in quality, until to-day there are available some thirty-five to forty vat colors of American manufacture.

When one stops to consider the tremendous amount of research work and the financial investment necessary to arrive at the present stage of development, a tribute must certainly be paid to the personnel of the dyestuff companies responsible for such development. Nor has this development been encouraged by economic conditions prevailing in the dyestuff industry during the past ten years. If one studies the average prices of dyestuffs of American manufacture one finds that the average price since 1917 has steadily declined. I will quote from the Census of Dyes, issued by the U. S. Tariff Commission for 1927. On page 35 of this booklet appears the following statement:

"It is doubtful whether in recent years the domestic industry as a whole has had a reasonable return on its capital investment, as many dyes were sold at or near their cost of production. Had the average price received for dyes in 1921 prevailed in 1927, sales in 1927 would have totaled $81,621,539 instead of the actual figure $38,532,795." In other words, during the most critical time of the dyestuff industry in this country, when all available financial resources were required for development and research, the financial returns resulting from the sale of products decreased steadily to the extent of more than 50%. As witness to the good-will of the American dyestuff manufacturers in face of this tremendous handicap, let me quote again from the Dye Census on page 38:

Rapid Increase in Vat Dye Consumption

"The year 1927 witnessed a large increase in the number and quantity of *fast dyes* made in the United States. Extensive research now under way points to further production of dyes possessing high resistance to destructive agents. The pronounced trend toward an increasing use of fast dyes promises to continue, especially as the domestic consumer realizes the economy resulting from the use of fabrics dyed with fast colors. Marked progress was made in the production of the following dyes:

1. Vat dyes including anthraquinone and the thioindigoid derivatives.
2. Derivatives of alizarine and the acid and mordant types.
3. The fast type of direct dyes of the azo class."

I have for display a chart showing the domestic production of vat colors other than Indigo for the years 1917 to 1928, inclusive. On this chart I also have the importations of vat colors other than Indigo

for the period of 1920 to 1928, inclusive. There are no imports in the years 1915 to 1919, inclusive, but in 1914 vat colors were imported to the extent of almost 2,000,000 pounds. A study of this chart reveals some interesting information. The domestic production was practically negligible until 1920 when rather over 1,000,000 pounds of vat colors were produced. In 1920 there were also over 700,000 pounds imported, making the total consumption very close to the 1914 consumption, all of which was imported. The general depression of 1920-1921 caused a decided slump in American production, the figure falling to roughly one-third of the 1920 production. At the same time, the importations increased, making a total consumption of 1,400,000 pounds, which figure is somewhat lower than the 1914 figure. With the better trade conditions in 1922, the American production increased again to almost the 1920 figures and was exceeded by almost 500,000 pounds by importations. The total consumption was higher than any previous year, reaching a total of 2,600,000 pounds. From 1923 on the American production has gone up in leaps and bounds, so much so that in 1927 almost 6,000,000 pounds of vat colors other than Indigo were produced in the country. Including importations, the figure reaches almost 8,000,000 pounds. American production figure for 1928 is 6,300,000, and importations are 2,300,000 pounds, an increase of about 600,000 pounds over 1927. Among other things the chart proves two main facts:

1. That the domestic consumption of vat colors is increasing tremendously.
2. That the American dyestuff manufacturer, in spite of falling prices, has maintained his economic status and at the same time has developed commercially one of the greatest chemical researches ever attempted, under pressure of time.

The Uses of Vat Dyes

It is not the purpose of this talk to take up your time with prolonged discussion of the history or development of the vat color industry, but rather to offer for your consideration a discussion of the varied uses of vat colors on different types of fiber with the object of illustrating the versatility of this class of dyestuff. In the time at my disposal it naturally is not possible to go into great detail in the description of every dyeing process. What I shall endeavor to do is to give brief descriptions of the many different types of dyeing possible to be done and to point out as far as I can certain factors which must not be lost sight of in successfully applying vat colors. Vat colors to-day are being successfully dyed on:

1. Cotton raw stock.
2. Cotton yarn; under this head falls the dyeing of skeins, warps, packages and beams.
3. Cotton piece goods on the pad, jig and continuous machine.
4. Rayons, particularly viscose.
5. Pure silk.
6. Print goods.

As in all other types of dyeing, it is just as necessary in vat color dyeing to know the characteristics and properties of the individual colors in order to get satisfactory results. To accomplish this end a study must be made of exhausting properties, reduction and dyeing temperatures, influence of varying quantities of chemicals, the relative fastness to light and weather, chemick, boiling soap and other tests. Perhaps the best starting point for the dyer who is contemplating the use of vat colors is to make two broad classifications of his colors:

1. On the basis of dyeing temperature.
2. On the basis of speed of exhaust.

It perhaps is not so vitally important to adhere rigidly to this or any other classification in skein or stock dyeing, but for successful piece goods and package dyeing it is very essential to know something about the properties of the dyestuffs if uniform results are to be obtained and ended goods avoided. I do not have to stress the general rules of "colorography" and tell you to avoid as far as possible colors which contrast greatly in shade and properties. Such, for instance, as dyeing a red in combination with a green, etc. Naturally, these rules apply in vat color dyeing as in any other form of dyeing. As an added precaution it is advisable in vat dyeing to avoid as far as possible combination dyeings of Indigoids (thianthrenes) and Anthraquinones (anthrenes). There are instances where they can be used in combination, but generally the two types of colors have a tendency to "clash" by virtue of their differing chemical character and properties.

There have been sheets distributed to each one of you showing anthrene and thianthrene colors classified in the two ways suggested above. By combining the information in the two classifications with some practical experience in manipulation of vat colors you will quickly learn what adjustments may be necessary according to local conditions. Generally the idea of using colors which exhaust about the same and have about the same chemical properties and dyeing tem-

ANTHRENE AND THIANTHRENE COLORS CLASSIFIED AS TO DYEING TEMPERATURE AND SPEED OF EXHAUST

	Reduction Temp.	Exhaust Speed
Colors dyed at 80° F.		
Anthrene Red FFA Double Paste	120	Slow
Anthrene Yellow AG Double Paste Fine	120	Slow
Colors dyed at 100° F.		
Anthrene Jade Green Paste	140	Fast
Anthrene Brown RA Paste	140	Fast
Anthrene Olive R Double Paste	140	Fast
Anthrene Brown G Paste	140	Fast
Anthrene Dark Blue BO Paste	140	Very fast
Anthrene Red Violet RRN Paste	140	Slow
Anthrene Violet BNX Paste	140	Medium
Anthrene Violet RN Paste	140	Medium
Anthrene Orange RC Paste	140	Fast
Anthrene Flavone GC Double Paste	140	Medium
Colors Dyed at 120° F.		
Anthrene Blue GCD Double Paste	120	Medium
Anthrene Blue BCS Paste	120	Slow
Anthrene Blue RCX Paste	120	Slow
Anthrene Blue 3G Paste	120	Very slow
Anthrene Bordeaux B Paste	120	Fast
Colors dyed at 140° F.		
Thianthrene Pink FF Paste	200	Very slow
Thianthrene Pink FB Paste	200	Very slow
Anthrene Blue RS Paste	140	Medium
Anthrene Brilliant Blue R Paste Fine	140	Very fast
Anthrene Dark Blue BO Paste	140	Very fast
Anthrene Yellow G Paste	140	Medium
Anthrene Golden Orange G Paste	140	Medium
Anthrene Golden Orange RRT Paste	140	Fast
Anthrene Golden Orange 4R Paste	140	Very fast
Anthrene Brown BB Paste	140	Very slow
Anthrene Violet 2R Paste	140	Very fast
Thianthrene Red Violet RH Paste Fine	140	Fast
Thianthrene Orange R Paste	140	Slow
Anthrene Black B Double Paste—		
Reduced and dyed at	176	Very fast

	Dyeing Temp.
Exhaust Speed: Very Slow	
Anthrene Blue 3G Paste	120
Thianthrene Pink FF Paste	140
Thianthrene Pink FB Paste	140
Anthrene Brown BB Paste	140
Exhaust Speed: Slow	
Anthrene Red FFA Double Paste	80
Anthrene Yellow AG Double Paste Fine	80
Anthrene Red Violet RRN Paste	100
Anthrene Blue BCS Paste	120
Anthrene Blue RCX Paste	120
Thianthrene Orange R Paste	140
Exhaust Speed: Medium	
Anthrene Violet BNX Paste	100
Anthrene Violet RN Paste	100
Anthrene Flavone GC Double Paste	100
Anthrene Blue GCD Double Paste	120
Anthrene Blue RS Paste	140
Anthrene Yellow G Paste	140
Anthrene Golden Orange G Paste	140
Exhaust Speed: Fast	
Anthrene Jade Green Paste	100
Anthrene Brown RA Paste	100
Anthrene Olive R Double Paste	100
Anthrene Brown G Paste	100
Anthrene Orange RC Paste	100
Anthrene Bordeaux B Paste	120
Anthrene Golden Orange RRT Paste	140
Thianthrene Red Violet RH Paste Fine	140
Exhaust Speed: Very Fast	
Anthrene Dark Blue BO Paste	140
Anthrene Brilliant Blue R Paste Fine	140
Anthrene Golden Orange 4R Paste	140
Anthrene Violet 2R Paste	140
Anthrene Black B Double Paste	176

peratures is a sound basis on which to make practical tests.

The question of concentration of caustic soda and hydrosulphite also has to be considered. Some colors require more chemicals than others, while some give greater tinctorial value with lesser quantities of chemicals. Perhaps the most satisfactory way to calculate is on the basis of concentration per gallon of dye liquor rather than on percentage of material weight. The question of pH controls in vat color dyeing is one which could easily be treated as a separate subject. There are a good many difficulties to consider, chief among which is the fact that pH controls are very difficult to make by the simpler method of colorimetric indicators. The intense color of the vats themselves make for conflicting results and probably the most satisfactory method yet devised is that of electrometric control.

After all, the vats themselves are very good indicators of the condition of the reduced dyestuff, as most of them exhibit characteristic and decided color changes over the color of the dyestuff itself. A little experience is an excellent teacher for the dyer who would become capable of judging the degree of reduction by observation, and a careful attention to established recipes and formulae will go far toward duplication of results. In those cases where the color change is not very distinctive the use of filter paper dyed with Anthrene Yellow G is often of advantage to indicate whether there is sufficient hydrosuiphite present. There have been published from time to time in the AMERICAN DYESTUFF REPORTER papers dealing with the application of vat colors.* A careful study of the literature and information published by the dyestuff companies will reveal to the prospective vat dyer much in the way of fundamental principles, and experienced demonstrators are always available to adjust these principles to local conditions of equipment, production, etc.

IMPORTANCE OF THOROUGH REDUCTION

No matter what style of dyeing is to be done, it is of the utmost importance that the colors be thoroughly reduced. Personally I prefer to figure in all cases on dry chemicals. Solutions of caustic soda made up to a definite specific gravity can be used, but if they are kept too long in open tanks carbon dioxide is absorbed from the air and these solutions then contain varying quantities of sodium carbonate, which reduced their efficiency and will cause formation of insoluble calcium and magnesium salts in case the water is at all hard. In the case of package dyeing, these insoluble salts filter out on the outside of the packages and cause unnecessary rubbing and dusting and other troubles. Caustic soda can be obtained in chips, and if kept closed from the air in this form proves more satisfactory. It dissolves very easily in warm water, and this operation can be made the starting point of the preparation of the *"stock vat."* Generally, therefore, the correct quantity of caustic soda is dissolved in a volume of water equal to about twelve times the weight of color to be used and the solution brought to the correct reduction temperature. The color is then added and stirred in well and allowed to stand for a few minutes. Any additions of oils or penetrants (such as Neomerpin VD, which I shall mention again later) are made, and then the hydrosulphite is slowly sprinkled in, the vat stirred gently to prevent too much contact with oxygen in the air. The vat is then allowed to stand for fifteen or twenty minutes to complete the reduction of the color, and is then ready to be added to whatever type of machine or dyeing is to be performed. A good general rule to observe is to "sharpen" the dye bath with a little caustic soda and hydrosulphite. In some cases it is desirable to allow this "sharpened" liquor to circulate through the machine, coming in contact with the material. This is more important in stock and package dyeing to prevent premature oxidation of the color.

The whole theory of vat dyeing is based on the formation of soluble leuco compounds, which are substantive to vegetable fibers and to a varying degree to animal fibers. It is the reoxidation of these leuco compounds to essentially their former condition which gives the final color. Obviously, therefore, this oxidation is just as important as the first operation of reduction if the full tinctorial value and maximum fastness of the color are to be obtained, and after the actual dyeing operation the general procedure is to make use of such oxygen-carrying chemicals as potassium bichromate, sodium perborate and others. In most cases the reoxidation is rapid to the point where the leuco compound is transposed to a form where it is no longer soluble, but this point does not represent the maximum degree of oxidation. A thoroughly efficient and complete treatment in boiling soap is necessary, and any short-cuts in this should be strongly discouraged. The question of production naturally is an important one, but it can be demonstrated that those styles of dyeing which sacrifice completeness of oxidation for production do not give dyeings of maximum fastness.

VATS ON RAW COTTON

The dyeing of raw cotton probably presents the least difficult problem. As in all types of raw cotton dyeing, careful packing of the machine and a thorough wetting-out of the stock to prevent unevenness and channeling are

*Reduction of Vat Colors, M. MacKenzie, Vol. XIV, p. 557.
Dyeing of Vat Colors on Rayon, F. F. Warshaw, Vol. XV, p. 3.
Dyeing with Vat Colors, W. H. Cady, Vol. XVI, p. 186.
Vat Dyeing Piece Goods, O. W. Clark, Vol. XVII, p. 617.

very important. If colors of similar properties are chosen there should be no particular difficulty of unevenness; and, of course, when large lots are being dyed, blending in the pickers and carding machines will overcome most troubles in that direction. Too high a concentration of alkali in the dye bath is apt to cause slimy stock and should be avoided. In the dyeing of heavy shades the stock must be thoroughly washed after dyeing. Neglect of either or both of these points may give trouble in the carding machines. It is a good plan to add common salt to the last wash water and allow the cotton to lie in the bin for a few days. The hygroscopic nature of the salt will cause the picking up of moisture; which, of course, will help the carding. Raw stock cannot be soaped, and therefore the use of oxidizing agents is very necessary. The open cellular construction of raw cotton aids materially in oxidation of the color.

Dyeing of Cotton Yarns with Vat Dyes

Under this general subject we have to consider the dyeing of skeins, warps, packages and beams. Skeins are dyed either by hand in open tubs or in one of the machines of the type of the Buhlmann or Smith-Drum. A volume of dye liquor equal to about twenty to twenty-five times the weight of material is best for most purposes. The stock vat should be added in portions, if light shades are being dyed, and the usual precautions of systematic turning observed. In skein dyeing, classifications need not be too rigidly adhered to, although a measure of precaution is necessary. In the dyeing of warps it is advisable to double the warps back to 1,500 yards or less. Here the selection of colors is most important to obtain uniformity of shades, and owing to the concentration of the bath those of maximum solubility have preference, particularly in heavy shades.

Thorough wetting-out of the yarn is very essential. Generally speaking, it is best to feed the color throughout the run over the first two ends, putting one-sixth of the reduced color on the first end and feeding two-sixths. At the beginning of the second end another sixth is added and the remaining two-sixths fed on during the run. Finally two more ends are given to exhaust. On very light shades it is advisable to feed the color over four ends instead of two to insure level dyeing. The penetration of warps is usually not very good, as the color picks out very rapidly and lies on the surface of the yarn. Consequently, effective squeeze rolls are very essential and penetrative aids can be used to advantage. The final operations of oxidizing and thoroughly efficient soaping should have careful attention, as the rapidity of production and the relatively short time that the yarn is in the dye liquor are contributory to indifferent fastness to crocking.

While all vat colors are not suitable for the dyeing of packages and beams, owing to relatively poor insolubility of the leuco compound, the majority of them can be used if due attention is paid to correct selection of combinations. Very careful attention must be paid to the winding of the packages. There is a certain shrinkage during the dyeing operation, and if packages are too tight to begin with it will be difficult to avoid dyeings which show weakness in the center of the packages. This variation in shade is not so noticeable when the yarn is woven into a broken colored pattern, but where any number of threads are run together it is noticeable, and while on a four-box loom it can be overcome to a certain extent by alternating bobbins every other pick, it is naturally advisable to avoid all these complications by careful attention to the dyeing. The short bath (1 to 8 or 1 to 12) of most closed machines increases the absorption speed of the dyestuff, and it is always advisable to use retarding agents such as animal glue and penetrating agents such as Neomerpin VD, particularly on light shades.

It is very advisable to strain the stock vat before adding to the machine to remove any insoluble matter. Personally, I prefer to start dyeing at a temperature about 15 to 20 degrees below the correct temperature, adding the reduced color in portions and making periodic shifts of the flow of liquor until all color is in. Then the temperature may be increased and dyeing continued as usual. Those machines which are fitted with a suction device for removing liquor from the packages seem to offer some advantages because they admit of a rapid removal of chemicals used for reduction and draw air through the packages so that partial oxidation of the leuco compound is effected almost immediately, decreasing the possibility of uneven oxidation.

There are several ways of dyeing cotton piece goods:

1. Continuous machine.
2. Padding the reduced color.
3. Dyeing on the jig.
4. Padding the unreduced color and finishing on the jig.

Which of these methods is best is dependent largely on the nature of the dyeing to be done. For large production (10,000 to 15,000 yarns) of light or medium shades on easily penetrated goods the continuous machine is perhaps the best, yielding as it does somewhat faster dyeings than padding the reduced color. A typical continuous range consists of a three-bowl padder in range with an open soaper. The goods are padded in the reduced dye liquor and, on leaving the

pad, pass through two or three boxs containing caustic soda and hydrosulphite at the same temperature as the padding liquor. This operation re-reduces the color and in the next box it is given a cold water wash. Next comes a box containing bichromate and acetic acid or sodium perborate; I prefer the latter as being a little more positive in its action and not having any tendency to dull the shades. In the next two boxes is a warm water wash, the first of which may be slightly acidulated in the case of perborate oxidation. The goods are then sufficiently oxidized to be piled in the box trucks and are finally thoroughly soaped in rope form, water mangled and dried and are ready for finishing. Great care is necessary in the operation of such a range to maintain even shades. The colors must be carefully selected on the basis of their exhaust speeds and are very carefully fed on during the run.

The Reduced Padding Method

The reduced padding method is similar to the above in principle, and is best used for small lots where a fast padder is available. The goods are padded, batched in rolls on the padder and transferred to a jig for oxidation and soaping. The dyeings are not as fast to laundry washing as the continuous method produces, and difficulties of control of shade are greater, owing to smaller yardage to correct any tailing off which may occur even when dyeing a straight shade. This may be overcome by feeding a more concentrated liquor than is used in the padding box at the start. At 40 yards per minute about twice the concentration used at the start will hold the shade up to strength. If a fast slop padder with a speed of 100 to 120 yards a minute is used "tailing" difficulties are lessened but fastness to soaping is impaired and the speed of the cloth is apt to raise foam which will cause spotty goods. A small pad box shaped to fit close to the bottom roll has been found helpful in reducing the foam. If the goods are piled directly in a box truck instead of batching on a roll directly on the pad, box marks are apt to occur. In light shades a skying of the cloth as it comes from the pad is a good plan if it is necessary to run the goods directly into the box truck. This gives the color a chance to oxidize and become partially fixed.

For the dyeing of relatively small yardages of cloth, dyeing of the jig is perhaps the most satisfactory method. This is true of light, medium and heavy shades and, as a matter of fact, heavy shades can only be dyed satisfactorily in this apparatus. The fact that the cloth is in contact with the dye liquor for a longer period of time makes for faster dyeings. The use of the jig also comes into play in the next dyeing operation which I shall describe, that is to say, the pigment padding method, as in this case, as I shall describe, the final operation is performed on the jig. In this particular the two methods are very closely related with the exception that heavy shades cannot be made by the pigment padding method. In jig work it is very important to pay particular attention to the solubility of the color in order to avoid spots, and, of course, to select carefully the colors for combination shades. The ordinary jig is suitable for this work except that any brass or bronze rollers should be replaced with wooden ones. It is perhaps a good general thing to remember that copper, and to a similar extent brass and bronze, has a tendency to dull the shades of vat colors if present in too large quantity. Another important thing is that the goods be rolled uniformly at all times and that they be kept swinging at the end of each run, as the color will remain reduced and consequently in a soluble form and will have a tendency to settle to the bottom of the roll. The jig should be filled as near to the top as is practicable in order that the cloth be kept out of contact with air as much as possible to prevent undue oxidation. While, of course, it is not possible to lay down hard and fast rules for the quantities of chemicals to be used, the following chart will give a typical example for the preparation of varying strength dyeings of Anthrene Blue GCD. The figures are on the basis of the single strength pastes:

Color in Paste:						
8 oz.	1 lb.	2½ lbs.	5 lbs.	7½ lbs.	10 lbs.	20 lbs.
Hydrosulphite Conc.:						
2 lbs.	2 lbs.	2 lbs.	3 lbs.	4 lbs.	6 lbs.	8 lbs.
Caustic Soda (dry) 100 gals.:						
3 lbs.	4 lbs.	4 lbs.	5 lbs.	5 lbs.	5 lbs.	7 lbs.

The stock vat is prepared as usual and the reduced color carefully strained into the dye liquor, previously sharpened. The temperature of the dye liquor should be about 100° F., which is 20° lower than the normal dyeing temperature for this color. The actual operation can be stated as follows:

1. Wet out with Neomerpin VD.
2. Sharpen the dye liquor with a little hydrosulphite and caustic soda and give the goods two ends. Bring the bath to 100° F. and strain in one-fourth of the reduced color.
3. Rake well and give the goods one end.
4. Add the remaining color, one-fourth at a time, giving the goods one end after each addition.

5. Bring the bath up to dyeing temperature, 120° F., and give about six ends, sampling as the dyeing goes on to get an idea of the shade.
6. Cold water wash, two ends.
7. Oxidize two ends, either in bichromate and acetic acid or perborate.
8. Hot water wash, two ends.
9. Soap at the boil four to six ends.
10. Wash hot until free from soap.

For pale shades the number of ends, of course, can be reduced and the addition of hydrosulphite and caustic soda during the dyeing operation may not be so necessary as for heavy shades. The longer the run the more necessary does it become to watch the vat carefully, always bearing in mind that additions of hydrosulphite alone will not necessarily maintain the reduced condition of the color because hydrosulphite neutralizes caustic soda, and it is very important to have an excess of alkali at all times. For dyeing light shades the addition of some retarding agent, such as animal glue, is advisable.

Methods for Uniform Shades in Light Tints

Perhaps the best way to obtain uniform shades over a big yardage of goods is to employ the "pigment padding" or "padding the *un*-reduced color" method. This is particularly true in the dyeing of light tints. Perfectly level and uniform dyeings can be made, of the best fastness properties, as the method is really a combination of pad and jig methods. The first operation is a mechanical one. That is to say, the dyestuff paste is mixed with water and gum thickening, preferably a mixture of tragacanth and gum arabic. Tragacanth aids penetration and gum arabic gives adhesive properties. It is necessary to use fine pastes for this work such as are used for printing, and some mills even subject these pastes to an additional grinding operation. The whole object of this first operation is to get the color into as near a perfect colloidal suspension as possible, and it is then strained carefully through a fine cloth. This colloidal suspension is then padded at 120° to 140° F. and batched on rolls. It must not be dropped into a box while wet as this causes streaks. The goods are then dried and transferred to the jig, and reduced in caustic soda and hydrosulphite at the correct temperature for colors used, for four to six ends and oxidized, soaped and finished as described under jig dyeing.

The fact that the colors are mechanically applied to the cloth eliminates consideration of differences in exhaust speed, and colors which ordinarily could not be used in combination can be used by this method. Another advantage is that long runs can be "padded unreduced," dried and stored until a convenient time for finishing in the jig is available. If it is necessary to shade the goods this can easily be done by adding whatever colors are necessary to the jig during the operation on this apparatus. This method and ordinary jig dyeing gives the most completely developed, and, consequently the fastest dyeings; the continuous range is next and the reduced padding method last.

Rayon, Silk and Vat Printing

Just a few words about rayon, pure silk and printing.

Rayon is dyed like cotton skeins with the minimum amount of handling to eliminate winding difficulties. There are several features which may be of interest to you. The Smith-Drum or Buhlmann machine can be used to great advantage in this type of work. One of the most important factors to keep in mind is to make no attempt to crowd the machine to prevent snarling of the yarn. I recommend the use of a long dye bath, 1 to 40 or even 1 to 50, with as low a caustic concentration as possible. Too high caustic concentration will cause sliminess on the skeins which will cause them to creep on the spools and gravitate towards each other. The actual caustic concentration depends on the color and depth of shade and can only be determined by experience and experiment. After dyeing the yarn is given an oxidation in sodium perborate, followed by a rinse prior to soaping which should be done at 160° to 180° F. Some dyers add a little soluble oil to the soap bath and do not rinse after soaping. Experience seems to dictate that a slow drying at 160° is best. A suitable room with closed steam coils for heating is best. The yarn is hung on racks and brass pipe is a good thing to use for these racks as the yarn slides off easily. When dry the steam is shut off and the hot air exhausted by a fan. The room is then closed and open steam introduced to fill the room. This is allowed to remain for a short time to permit the yarn to absorb moisture. This treatment reduces the static electricity set up if the yarn is too dry and certainly decreases winding difficulties. Careful selection of the colors used and the normal precautions for dyeing a fiber that notoriously has great affinity for color, is about all I can add.

Not all vat colors have good affinity for pure silk. As a class the Indigoids are better than the anthraquinones, although some of the latter are very satisfactory. Generally, pure silk is handled like rayon except that care must be exercised to keep the alkali down in order to protect the silk. A good method

is to use sodium bicarbonate to neutralize the caustic soda necessary for "setting" the vat after this has been accomplished. The stock vat is prepared as usual.

The use of Neomerpin VD, Goulac or Glue is advisable to form an additional protective colloid for the silk. Neomerpin VD is a product specially prepared for vat dyeing. It promotes dispersion of the dyestuff, reduces the surface tension of the dye liquor and is a most efficient aid to penetration. It is a product scientifically evolved after careful observation of many factors and for all types of vat dyeing is finding a wide use. Particularly for the type of dyeing where the goods are in the liquor a very short time is it of great value.

Vat color printing is too big a subject to insult by just touching on it, but that is all I can do in this paper. Fine pastes are used and are incorporated in suitable thickeners, such as British gum, together with starch, glycerine, potassium carbonate and formopon. The goods are printed, dried, steamed in a rapid ager in free steam at 216° F. to develop the color. Subsequently, operations of washing, oxidizing and soaping follow the same lines as in dyeing. There are many factors to watch and different gums give varying results. The ager must have just the right condition of temperature and humidity. For those of you who are interested in this phase of textile work I can recommend no better textbook than "The Principles and Practice of Textile Printing" by Knecht & Fothergill.

Variations in Fastness in the Vat Colors

And now in conclusion, let me leave with you a few further thoughts.

It does not necessarily follow that colors which are fast as individuals display the same properties in combination with each other. Reversely, some colors which are not fast as individuals inherit fastness when dyed in combination with a faster color. One well known example of this is Anthraflavone. As a self shade, it has no particular light fastness, but greens produced from it and Blue G C D show very good fastness to light. In other words, the user of vat colors needs to be exceedingly careful in any statement he makes regarding special fastness requirements and not make such statements unless he has actually verified them by test to see if the colors selected possess the necessary fastness when dyed in combination. This problem also belongs to the dyestuff manufacturer, but it is obvious that he must have the co-operation of those whom he is ready and willing to serve with his technical organizations. In other words, he cannot intelligently answer inquiries as to whether such and such of his colors are fast to a certain set of fastness specifications unless he is also informed of several other factors which have a bearing on the case in question. For example, certain vat colors dyed in light shades will not stand a short exposure to light or to the Fade-Ometer, but in heavier shades they will. By the same token, as I said a few moments ago, some colors which are fast by themselves are not as fast when dyed in combination with each other, and it has been proved by actual test that such a combination appears less fast to a short exposure than does a notoriously relatively fugitive vat color. On a longer exposure, exactly the reverse conditions are obtained, so that the short exposure in such cases is an actual fallacy of the final outcome.

Advantages of Co-operation

Such things as this only add to the troubles of both manufacturer and consumer, and the closest co-operation between the two is absolutely essential. A few suggestions are in order as representing a step towards this co-operation. The suggestions cover both sides, and for the consumer I would state that in asking the manufacturer for information he should:

1. Send samples of the shades with the detailed specifications they should fill to the manufacturer for his tests.

2. If no shares are available, advise as completely as possible what is expected of the colors and under what conditions they are to be dyed.

3. Make the necessary tests on his own mill-dyed goods to be sure that they measure up to the specifications, as it may be necessary to change the methods of application to obtain the desired fastness. This is very important because, as I have explained, dyeings of varying fastness result from various methods.

For the dyestuff manufacturer I suggest that he:

1. Classify his straight colors as nearly as possible to conform to certain standard specifications and have this information available for the benefit of the dyestuff consumer.

2. Investigate thoroughly the most suitable combinations of colors from the standpoint of fastness and suitability of application in various processes.

3. Continue to work constantly on the development of new colors and new methods.

There is no wish to infer that the above suggestions are not being carried out at present. The suggestions are made rather with the idea of sounding a warning note to make the best of what we have and still keep looking ahead. This is the only manner in which progress can be made.

I have brought along with me, among other exhibits, some tests made recently of a good many vat colors dyed and printed in light and medium shades and subjected to the tests called for by textile dyers and finishers using the NAFAL label. As a representative of a dyestuff manufacturer I think I can claim that this exhibit partly answers suggestion No. 1. In support of suggestion No. 2 I have also a goodly number of dyeings of various combinations of colors, and further information in this connection is on the classification chart which you have. For suggestion No. 3 I will content myself with a statement of goodwill from my own company to the textile trade, supported by my previous quotation from the Dye Census, and to assure you who are engaged in or contemplating the use of faster colors that it is our most earnest desire to co-operate with you in your experimental and practical problems, by giving you the benefit of our knowledge of, and experience with, these important dyestuffs.

SPRING MEETING OF THE SOUTH-CENTRAL SECTION

THE spring meeting of the South-Central Section was held at the Chattanooga Country Club, Chattanooga, Tenn., on the evening of May 4, Chairman L. L. Bamberger presiding.

Noel D. White, the first speaker of the evening, gave a very interesting talk on the life cycle of the silkworm—passing around exhibits showing the successive stages of development from the eggs to the cocoon. Mr. White created quite a little interest when he displayed some snelled hooks for bass and stated that these snells were made by taking a silkworm, which was ready to spin, and soaking it in a bowl of vinegar for twenty-four hours; then drawing the body out between the fingers to form the snell. Mr. White refused, however, to pass the hooks around, as he intended to use them in his own fishing!

Some of the Troubles of Dyeing Mercerized Yarn*

By Robert D. Sloan

Standard Coosa-Thatcher Company

I FEEL as though the subject given me has been harped on quite a bit, and is one with which all of you are more or less familiar; therefore, it will be harder to make an interesting talk on this subject than on some newer subject or method. However, as briefly as possible I will deal with this subject along the lines which we have actually worked out in the plant.

Mercerized yarns cannot as a whole be dyed as easily as unmercerized yarns. I would give two reasons for this: (1) The increased affinity for dyestuffs and dyestuff exhaustion which the mercerized yarn has. (2) The increased chance of the mercerized yarn having a more un-uniform bottom than the unmercerized yarn.

Since mercerized yarn has an increased affinity for dyestuff, it is necessary to choose dyestuffs more carefully. Direct colors which exhaust quickly and level poorly are not suitable for dyeing mercerized yarns; they will invariably go on streaked and fail to level with even hard boiling. Take, for instance, most of the direct sky blues on the market. These colors exhaust very slowly until salted, then they jump on in a very few minutes. Unless salt is added slowly with this type of color bad results are sure to obtain. For example, in skein dyeing light places under tie bands will be present; in package dyeing a light centered package will result; while the hosiery dyer would probably experience light seams in heel and toe. It would be to every dyer's advantage to obtain product samples from the dyestuff manufacturers and test them for exhaustion and leveling qualities. This in its self would be an ounce of prevention. Slow exhausting colors which level well will give much better results than any other type on mercerized yarn.

In line with the choosing of dyestuffs the preparation of mercerized yarn for dyeing is a very important item and requires more care than the preparation of unmercerized yarn. This presents a larger problem to the yarn dyer than to the hosiery or piece dyer. I say this because the yarn dyer deals with packages, skeins and warps; any of which, if put up badly, will cause streaked or uneven dyeing. To illustrate: the mercerized skein with a tight tie or water band will invariably be light under this band, caused by the quick exhaustion of color before it can penetrate this spot. An unmercerized skein with the same tie band will dye level nine times out of ten.

The package of mercerized yarn wound for dyeing should be wound uniformly throughout, should not have too large a diameter, and should be wound soft. The reason for this is the excessive shrinkage shown by mercerized yarn on boiling out. The point I wish to emphasize is that a perfect dyeing may be obtained with a very tight package of unmercerized yarn, while the same package of mercerized yarn would have a light center.

Mercerized yarn, except in the piece, should always be boiled out before dyeing, preferably with the aid of some good assistant or penetrant. After a good

*Paper delivered before Spring Meeting of the South Central Section of the A. A. T. C. C., Chattanooga, Tenn., May 4.

boil-out, the dyeing should be started at a low temperature. Though my experience in hosiery dyeing has been limited, I would enter piece goods made of solid mercerized yarn into the boiling dye bath dry, as this procedure tends to do away with the ring or tiger stripe. However, the hosiery dyer handling the mixed fiber is up against a much tougher temperature proposition.

The dyer to whose lot falls some yarn which is badly mercerized has very few methods to fall back upon. Perhaps the best method to use in order to get even dyeing is a kier boil; the next best a quarter or half bleach; and last, the entering of drygoods into a boiling dye bath. However, it is very rare that uneven mercerization is encountered in this competitive period.

The colors picked to make mode shades on mercerized yarns should be picked with discretion. In making a red tan the use of a light brown, a red, and a shading black would be poor judgment, because the streaking of any one of these colors would show up badly due to the contrast between them. If a light brown and a dull red brown is used, however, very little contrast would be shown. Blues and yellows for making greens should be avoided as much as possible for the same reason.

(Mr. Sloan here called on P. F. O'Neill to supplement his remarks.)

Tiger Stripes on Mercerized Hosiery

By P. F. O'Neill.

(*Abstract*)

"ANYONE who has seen some of the first rayon constructions introduced is probably familiar with the phenomenon known as barre. In knitted fabrics that have been dyed, this barre effect occurs as variations in the depth of shade from one course to the next.

"The factors causing barre are many and varied. Naturally we turn to yarn as the first source. Fifteen years of constant experimentation and research, by groups of expert technicians, have practically eliminated irregularities in the manufacturing processes which tended to cause barre.

"Barre resulting from variations in the denier of the yarn are not uncommon. This type of barre is not so prevalent as formerly, due to the improved devices now available for metering cellulose solutions. A variation of from 5 to 7% in denier can cause a barre in knitted fabrics.

"Assuming we have a 150 denier yarn, we may expect to have a barre formed if the yarn in one course tests 150 denier and that in the adjacent course tests 142 denier or 158 denier. Where these maximum deviations from the desired denier occur in adjacent courses, the barre is greatly accentuated. In reality, then, we note that the variation from the desired denier should not be greater than plus or minus 3%, in order to allow for the possibility of this maximum addictive effect."

The foregoing passages are from an article appearing in various trade journals recently which was referred to by Mr. O'Neill in discussing the dyeing of mercerized yarn in the form of hosiery.

He said that these statements would be almost equally true if the terms "mercerized yarn" were substituted for "rayon," "count" for "denier," and "tiger stripes" for "barre." He stated that, "While it is possible to produce a rayon thread almost equally uniform in diameter, it appears to be practically impossible in the case of cotton yarn." Mr. O'Neill illustrated by giving some figures compiled from an examination of the twist in a mercerized yarn which was tested by taking successive tests of the twist in two-inch lengths of the thread. These tests showed a maximum variation of from nine turns to the inch to seventeen turns, and in the second case, from thirteen turns to twenty-one turns. Such variations in twist are not unusual in cotton yarns by any means. As a matter of fact the foregoig tests were made on yarns spun in mills with a reputation for spinning yarns of high quality.

Mr. O'Neill pointed out the difficulty of getting uniform processing or uniform dyeing from such yarns, and added that only by careful work in dyeing could a passable result be had. He especially recommended a good long boil of at least thirty minutes before adding salt to the dye bath.

"The barre in fabrics may often be minimized by careful selection of dyestuffs, or by dyeing at temperatures slightly higher than is customary. Certain dyestuffs tend toward non-uniform dyeing, and, of course, accentuate the barre effect."

A very animated and sometimes heated discussion took place after the two talks. The general conclusions seemed to be that while the mercerizer is generally blamed, and sometimes the dyestuff manufacturer, the real fault lies with the spinner for "tiger stripes." However, the dyer can usually overcome the difficulty if he properly understands his problem.

AMERICAN
DYESTUFF REPORTER
SAMPLE SWATCH QUARTERLY
Devoted to the use and application of dyestuffs and the mechanical equipment incidental thereto.
LOUIS A. OLNEY
PROFESSOR OF CHEMISTRY AND DYEING, LOWELL TEXTILE SCHOOL
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TAKING THE BROADER VIEW OF RESEARCH

THE man so absorbed in his own business that his mind becomes focussed wholly upon one industry is exposed to the danger of growing mentally nearsighted. Not taking time to learn what other industries are doing, he may soon come to believe that the industrial universe revolves about his plant, that no better product than the product he is making can possibly be made elsewhere, nor no more efficient system prevail than that which he has installed. All facts, all conditions are then seen only in relation to one's particular industry, and not for a moment is the idea entertained that much greater progress is being made in other industries.

This form of mental myopia may seem like an extreme case but it is not uncommon. It is the result of burying your nose in the work assigned to you while the rest of the world floats by unheeded. Like the robin on the field during the battle of Gettysburg that saw nothing but the worms in the grass, there are probably textile chemists who believe that their industry has been raising more dust over scientific research and achieving more valuable results than any other industry.

Recently the National Bureau of Economic Research made a survey to determine the extent to which industrial research prevails as a new trend in manufacturing progress. The facts were compiled by Maurice Holland of the National Research Council. His data were based on replies to a questionnaire sent out last year to 5,000 manufacturing concerns with a commercial rating of $1,000,000 or over. These firms were asked questions about their research activities. The replies came from forty industrial groups.

Of the 599 concerns that supplied information, 52 per cent reported the carrying on of research as a company activity. Testing laboratories are conducted by 7 per cent, leaving 41 per cent reporting that no research work is being done.

In regard to co-operative research conducted through trade associations, engineering societies, universities or endowed fellowships, 29 per cent reported that they were supporting such activities. An additional 15 per cent stated that they were considering extension of their research activities, and 11 per cent of those doing no research work at the present time reported that they are considering taking it up in the future.

Turning to the nature of research progress as revealed by the replies to the questionnaire, major emphasis seems to be on the improvement of product and service. It was possible to divide the programs submitted into five classes, the arrangement being in the order of importance: (1) Improved Product or Service, 67 per cent; (2) Reduction of Production Costs, 59 per cent; (3) Development of New Fields of Application, 40 per cent; (4) By-products and New Material, 30 per cent; (5) New Products, 8 per cent.

The request for information as to annual expenditures was not generally replied to. A number of firms said that they kept no special accounts to cover industrial research activities. However, 208 establishments reported annual expenditures to the total of $11,991,637. Expressed in averages this total is $57,652 per year for each firm which reported its expenditures.

A survey so broad and including a majority of the largest industrial firms in the country should be of interest to the men in every industry who are engaged in scientific research or in the business of "selling" the research idea to industrial leaders. At least one value of this survey lies in the breadth of view it affords of laboratory research in American industry. This view will be helpful if it impels the shortsighted research worker in any field to raise his eyes from his own problems and see that in many other industries research is blazing trails to new products, to improved products, to new uses for by-products. It will be enlightening if it awakens the realization that the textile industry in this country is setting no great example to others by its research activities; that in proportion to other industries in value of business it would most likely appear far from the top of the list in its expenditures in this direction. It should help to dispel the notion which exists in some quarters that the campaign for research on textiles is nothing more than the obsession of a few fanatics.

We may take still another view of industrial research. What has come to be known as "the New Competition" is a competition between one industry and another as distinct from the old form of competition between the products of one trade. To-day,

for example, oil battles with coal for supremacy as a fuel; electric refrigeration is breaking up the ice industry; Bakelite and similar compositions strive to replace wood and hard rubber; we have artificial leather, artificial wool and cotton, synthetic rubber, lacquers to replace paint, Cellophane to replace paper for wrappings and decoration, and countless other synthetic cellulose products.

All these, however, are merely the soldiers in the battle called "the New Competition." Behind the lines of commerce sits the research worker in his laboratory, planning new campaigns for his industry, creating new weapons to capture the markets of those who have neglected to set up their own defensive research. Every day we see new evidence to prove that no longer can any industry call itself indispensable. In an unguarded moment, on an unguarded frontier, the enemy breaks through the lines that were believed impregnable, and for a time there is the thunder and smoke of another industrial battle; but the enemy, using modern tactics, is too strong, and when the field clears it is seen that the invaders have hoisted their standard and another old industry (a "major" industry, it had once been called) lies in ruins, the victim of its own conservative, negligent, nearsighted policy.

RAISING THE TASTE FOR COLOR

IF there is one quality above others that distinguishes the textiles of this day from those of a generation ago it is the variety of their color range.

The modern penchant for putting color into the most ordinary household articles is too new to expect the same skill and taste in color application everywhere that we have been accustomed to see in textile materials. Some of the results have not been wholly pleasing to the aesthetic sense. Many things that we color to-day, like bed linen and bathtubs, look bizarre to eyes that have always seen these articles in black and white. But the effort to add beauty to the commonest products of industry has made us, as a people, acutely color-conscious. Taste for the appropriate color will follow naturally.

Meanwhile we examine more critically the colors of all the things we buy to use and wear. This commendable habit makes greater care in textile designing more than ever necessary. A generation that tries so hard to be discreet in its selection of colored automobiles, typewriters, straw hats and ash trays is almost certain to use finer discrimination in selecting its apparel. The textile industry, therefore, must strive to show the public that it recognizes the prevailing need for higher taste in the application of color to fabrics.

Significant in the light of this vogue are the scholarships recently established in three textile schools by the Textile Color Card Association. To develop a finer appreciation of color in the student, this association will pay the tuition for the second and third years of each student winning the scholarship for high rating in color appreciation and application during his first year at the school. The plan will help to draw the attention of all textile students to a fundamental that may otherwise be overlooked in the study of textile manufacturing.

The emphasis that is generally put upon the *technical* processes of the industry by most textile courses naturally tends to instill in the student a mechanical rather than an esthetic viewpoint. It tends to stress the science involved in textile manufacturing and subordinate those elements which give to a fabric the quality of a work of art. In an age when machinery and science have revolutionized industry to such a marked extent, however, these tendencies in education, especially in industrial education, are certainly not to be criticized. Nevertheless, under this system color appreciation would soon cease to be cultivated and taste in the application of color would suffer at a time when it becomes of increasing value. The color scholarships should foster the idea that color is not merely a quality added to textiles to make them more attractive in the store window, but an integral element of their beauty as apparel or as decorative fabrics, and that it can be made a dominant sales factor.

ANILINE DYE OUTPUT IN SWITZERLAND INCREASES

Manufacture of aniline dyes continues to be the most prosperous Swiss industry, according to information from the Vice-Consul at Basel, Albert W. Scott, made public by the Department of Commerce. The statement follows in full text:

"Output, which has increased steadily in recent years, promises to show a still further increase during 1929, the industry declares. Statistics are not yet available for March, but for the first two months of 1928 Swiss exports of aniline dyes were valued at 12,015,000 Swiss francs ($2,319,500), compared with 11,708,000 Swiss francs ($2,260,000) for the months of January and February of 1928.

"Practically all of the dyes exported from Switzerland are manufactured in Basel. The trade of Basel dye factories with Germany during the first three months of 1929 has not been so brisk as during the same period of 1928, but a considerable improvement is shown in trade with the United States, France and Italy, and exports to Great Britain have shown no decrease.

"Exports of aniline dyes to the United States from Basel during the March quarter of 1929 were valued at $478,867, against $355,775 for the first quarter of 1928.

EXTRACTORIALS

It is a self-evident truth that the fast colors have come to stay and that their use will be increasingly extended even to the lowest quality fabrics. Modern hygiene, the open windows, the washable garment and the vogue for fresh air and sunlight have secured and will maintain the consumption of dyestuffs of high, all-round domestic fastness.—*Textrion, in the Textile Argus.*

As men neither live to themselves nor die to themselves if they are accredited successful, neither do businesses. Individualism has its limitations and isolation its handicaps. Business and industry to-day are too complex for a single human mind to comprehend all about it.—*E. E. McCullough, in Chemical Markets.*

The several textile schools are doing wonderful work in assisting to reorganize the dyeing profession upon a chemical basis, and if they had the backing of more employers the results of their efforts would be more rapidly obtained.—*Textile Colorist.*

What is chiefly wanted in the textile industries is a complete, comprehensive, scientific study of all the details of the many operations. . . . Ford was not the originator of mass production. His chief claim to fame may be that he first demonstrated on a large scale the practical importance of the closest study of every detail of a manufacturing process; and the fact that cheapness of production was to be secured, not by the use of haphazard empirical methods, but by extreme exercise of control and accuracy of workmanship.—*Tizard, "Science and the New Industrial Revolution," in Journal of the Textile Institute.*

It is clear why we have termed rayon a chemical yarn and the rayon industry a chemical industry. It is chemical not only because it consumes a large amount of chemicals in its manufacturing operations but because its very production depends very largely upon chemical principles and chemical reactions.—*Rayon and The Rayon Industry.*

In recent years one industry after another has discarded with gratifying results "hit and miss" methods of measuring operating temperatures in favor of accurate scientific instruments. Many others are seriously considering doing so. Lack of scientific temperature control has been responsible for many troubles and a considerable monetary loss.—*Arthur D. Little Bulletin.*

Pay the price and get it. Most of us don't want things bad enough to pay the price. We want someone to give them to us. Everything is for sale at a price.—*Harris-Dibble Bulletin.*

Proper merchandising consists in the first place of finding out what the public wants; second, letting the public know that they want it; and, third, making it convenient for them to buy it. The procedure followed by cotton mills, on an average, is just the opposite. First, we build a mill; second, we make the goods best adapted to that mill; third, we keep lowering the price until this product can be sold.—*Cason Callaway, in Cotton.*

PUBLISHER OF "REPORTER" PRAISES NEW MANOIR RICHELIEU

MANOIR RICHELIEU
AT MURRAY BAY, PROVINCE OF QUEBEC

June 25, 1929.

Dear Mr. Hoagland:

Here we are—all set at the new Manoir Richelieu—and I must say that the advance notices fell very far short of conveying an adequate conception of the perfection of the place.

Having been here last summer, we were prepared for the beauty of the environment, though even the pleasantest memories were not quite up to the actuality when viewed again after a year's absence. When one considers that this entire establishment—even to the landscaping and walks—has been rebuilt since the disastrous fire of last September, the result is positively amazing.

The new Manoir is without doubt one of the most nearly perfect resort hotels in America. Although absolutely fireproof, the harshness so often evident in fireproof construction is entirely obviated by the artistic touch of the architect and the interior decorator. Inside and out the place has a combination of beauty and practicality that I have never seen equaled in an establishment of this character.

There is no lack of outdoor diversions. The golf course is as scenic as any I have ever played. The swimming pool, also brand-new, is large and most attractive. The food is as good and as varied as one could ask. There really isn't a thing to criticize.

It may not be good form to eulogize the products of an advertiser in the text pages of a publication which carries the advertising, but since the Manoir is the only place of its kind which has recently advertised in the REPORTER—and there are therefore no competitors to be annoyed—and since that advertising, a year ago, was responsible for my first coming here, I feel justified in asking you to publish this letter. If any of my friends have sufficient confidence in my judgment to risk coming here because of my indorsement (providing they can secure accommodations), I have no fear of losing their friendship thereby. I only wish every one of them could enjoy it as we are now doing.

Sincerely,

A. P. HOWES,
Publisher.

RECENT LITERATURE

RESEARCH IN NEW ENGLAND

"Bettering Production Methods Through Research," the ninth and last report in a study of Better Business Through Research in New England Industry, has been released by the Policyholders' Service Bureau of the Metropolitan Life Insurance Company.

In New England, many manufacturers have discovered that intensive research is essential to the proper selection and development of equipment and to the maintenance of production practices which will enable them to compete successfully on a profit-making basis. Constant study of market conditions, of industrial and trade trends and manufacturing improvements, has aided these various companies markedly in carrying on satisfactory business programs.

"Bettering Production Methods Through Research" is a compilation of actual cases, grouped according to industry, in which fact-finding has been employed to improve production methods.

Copies of the report will be sent to interested manufacturers who apply to the Policyholders' Service Bureau, Metropolitan Life Insurance Company, 1 Madison Avenue, New York City.

COMMERCIAL STANDARDS MONTHLY

For over four years the progress of work in the field of commercial standardization has been recorded in a multigraphed periodical known as the Commercial Standards Monthly. The demand for this publication has become so great (over 15,000 names are now on the mailing list) that permission has been obtained by the Bureau to issue it in printed form.

In its new form the Monthly will contain brief statements of the current status of projects in the commercial standards field, commercial aspects and applications of the general standardization work of the Bureau, references to similar work by other branches of the Federal Government, important achievements of national standardizing bodies outside the government service, examples of waste elimination as affected by trade associations and individual companies, abstracts of articles which bear on national or regional standardization, brief accounts of work abroad where such is of interest to American business men, and certain miscellaneous items, such as notices of new publications and investigations which are of interest.

As a printed publication the Commercial Standards Monthly will record the progress of work in its particular field, much as the Technical News Bulletin covers the field of research and testing.

The first number of the Commercial Standards Monthly will appear about July 15. It is obtainable on a subscription basis from the Superintendent of Documents, Government Printing Office, Washington, D. C., at $1 per year to addresses in United States and its possessions, Canada, Cuba, Mexico, Newfoundland and the Republic of Panama; $1.25 to other countries.

The P. H. & F. M. Roots Company, Connersville, Ind., has just issued a new sixteen-page bulletin, No. 22-B1, on "Low Pressure Type Rotary Positive Blowers." The bulletin covers the new Roots modernized blowers equipped with Timken, SKF and Hyatt bearings, and replaces the former bulletin 1011 issued by this company. With this bulletin the Roots company is including another new bulletin, 10-B1, "Covers Industry Like a Blanket," and a book on "Engineering Tables," all bound in a loose-leaf cover. This combination of three pieces contains much general engineering data which prove valuable for reference.

NEWPORT PURCHASES RHODIA CHEMICAL COMPANY

A chemical merger that will make the Newport Chemical Works, of Passaic, N. J., a dominating factor in the coal-tar manufacturing field in this country was effected on June 19, when Newport formally purchased the assets and business of the Rhodia Chemical Company.

As a manufacturer of technical, medicinal, photographic and industrial chemicals, the Rhodia Chemical Company is known to have extensive foreign connections. Chief among its products are synthetic perfumes and photographic chemicals derived from coal tar. The firm has been selling agent for the Chemische Fabrik Budenheim, of Mainz; the Chemische Werke vorm. H. & E. Albert, Biebrich, and the Gebrueder Guilini G. m. b. H., Ludwigshafen, Germany. It has also been the representative in this country for the Societe Chimique des Usines du Rhone, of Paris, and maintains an export company known as the Kay Laboratories at West Nyack, N. Y., and the Chemical Products Company in the same town.

The transfer was made at the offices of the attorneys for the Newport Company, Root, Clark, Buckner, Howland & Ballantine, of New York, of which former United States Senator Elihu Root is a member. The statement issued by the Newport Chemical Works explained that the Rhodia Chemical Company sold all the assets and business of the company and that the Newport Company assumes all of the former's liabilities, with certain exceptions.

The entire capital stock of the Newport Chemical Works, Inc., is owned by the Newport Company, Inc.,

a Delaware company organized in 1919, which, in addition to the Newport Chemical Works, owns the Newport Turpentine & Rosin Company, General Naval Stores and Acme Products, Inc. A stock interest formerly held in Milwaukee Coal & Gas was disposed of in 1927. The plant of the Newport Chemical Works is located at Passaic, N. J., and its flexo film division is in New York City.

New Company Incorporated

Earlier this month papers of incorporation for the Newport Chemical Works, Inc., were filed in Delaware, naming Elvin H. Killheffer as president and placing the capitalization at the nominal sum of $250,000, consisting of $100 par value shares.

The last available financial report of the Newport Company, Inc., places assets at a total of $15,325,000 and a surplus at the close of the year 1927 of $4,790,000. Net earnings for that year were $1,007,033. The company's capitalization consists of $1,000,000 common and $3,000,000 prior common shares, of which $929,000 common and $2,659,000 prior common shares are outstanding. Dividends ranging upward to 8 per cent have been paid on the prior common up to the year 1923, but since then the payments have either been omitted or cut down to 2 per cent, although 1 per cent extras have been paid on accumulations.

Two recent acquisitions, whose capital and earnings are not included in the above results, are the General Naval Stores Company, Inc., and the Acme Products Company. Combined sales for all companies for the year ended September 30, 1928, totaled over $6,000,000.

AMERICAN CYANAMID MERGES WITH KALBFLEISCH

The week of June 17 was marked by a number of mergers and consolidations among firms prominent in the American chemical industry. Following the announcement that the Newport Chemical Works had purchased the Rhodia Chemical Company came the news that the Calco Chemical Company had taken over the business of the Textile Chemical Company of Providence and had also bought out the Sulphur Dioxide Department of the King Chemical Company. Consonant with these transactions was the announcement that the American Cyanamid Company and the Kalbfleisch Corporation had consolidated their assets.

While no details regarding the terms of financing this Kalbfleisch-Cyanamid merger were revealed by the principals, it was understood that the transaction had been approved by the board of directors of both corporations and that it will be formally submitted to the stockholders for final approval.

A statement issued by the Kalbfleisch Corporation reads in part as follows:

"A reorganization of the Kalbfleisch Corporation with American Cyanamid Company through the consolidation of the assets of the Kalbfleisch Corporation with the assets of American Cyanamid Company has been approved by the boards of directors of both corporations, subject to confirmation by the stockholders of the respective companies. The Kalbfleisch Corporation will continue to operate as a separate organization and no change in the management is contemplated.

"American Cyanamid Company is a large manufacturer of mining and industrial chemicals and fertilizer materials, including cyanides, cyanamid, sulphuric and phosphoric acid, ammonia, prussiates, etc., with plants in the United States, Canada and Spain. The Kalbfleisch Corporation manufactures chemicals for paper making, textiles and other purposes at its six plants in the United States, and has ore mines and plant in Dutch Guiana, South America.

"The two companies use some of the same basic materials in their operations and this reorganization will create advantages through consolidation of plant facilities, research and technical developments.

"The one hundredth anniversary of Kalbfleisch in the chemical industry was celebrated in March, 1929."

DU PONT INVOLVED IN NEW ALCOHOL NEGOTIATIONS

A 50 per cent interest in the Eastern Alcohol Corporation is being sought by the U. S. Industrial Alcohol Company, according to reports recently circulated in the market. The Eastern company is at present partly in the control of E. I. du Pont de Nemours & Co., which owns half of the firm's stock.

Reference is also made in these reports to a new cellulose acetate for rayon developed by the United States Industrial Chemical Company, a subsidiary of the U. S. Industrial Alcohol. This new product, which is produced at low cost and finds uses in the photographic film industry as well as in rayon manufacture, is soon to be marketed, and it is pointed out that the move to acquire a half control in Eastern Alcohol may result in a close alliance being effected between Du Pont and U. S. Industrial Alcohol. This would provide the latter firm with an excellent outlet for its production of the new acetate.

The O. K. Piece Dye Works, Inc., Paterson, N. J., have awarded general contract to Charles Cona Construction Company, Paterson, for one-story dyehouse, 50 by 126 feet, brick, to cost about $25,000, with equipment.

The Ray-Ser Dyeing Company, Chattanooga, Tenn., has placed orders for machinery and equipment to increase the capacity of the plant 50 per cent, to be installed the first part of July.

Technical Notes from Foreign Sources

Foreign Substances Occurring in Cotton

Dr. Hugo Kauffman; Mell. Textil-Ber. 9, 575 (1928).—A lecture delivered before the Thirteenth Congress of the International Society of Chemists and Colorists in May, 1928. The paper deals with contaminants which may gain entry to the material, from its harvesting through its working up into yarn. Two principal groups of such foreign substances are dealt with, those of metallic and those of oily nature. The last part of the paper takes up the continually more interesting and valuable results gained by examination under the ultraviolet lamp.

Oxy-Cellulose and Mercerization

E. Ristenpart; Mell. Textil-Ber. 9, 577 (1928).—A lecture delivered before the Thirteenth Congress of the International Society of Chemists and Colorists in May, 1928 (see preceding). The point raised for consideration is that "through the presence of oxy-cellulose the proof that a sample of cotton has been mercerized is made questionable." The author recommends resort to the microscope, an instrument "not exactly loved in questions of the determination of the existence of mercerization. To be sure, examination under the microscope shows, in a mercerized cotton, some fibers with spiral striations beside those which are smoothly cylindrical; but the experienced microscopist cannot be misled by these, and the beginner is advised to examine the sample in question microscopically side by side with a mercerized and an unmercerized sample for comparison."

Linen and Aqueous Caustic Soda

Prof. M. M. Tschilikin; Mell. Textil-Ber. 9, 592 (1928).—A study (one graph and a large table included) of the action of caustic soda solution upon linen, similarly to what is involved in the mercerization of cotton. The author's conclusion is that while the action in the case of each fiber is in general, the results are divergent, and that, at least, mercerization cannot as yet be successfully carried out upon linen with any worth-while results.

Methods of Examination of Starches and Their Derivatives

F. L. P. Krizkovsky; Mell. Textil-Ber. 9, 594 (1928).—In two sections. The first part discusses the estimation of color and of water content of the solid materials and the viscosity of their pastes. The second part (Mell. Textil-Ber. 9, 766, 1928) continues the discussion of the determination of viscosity of the pastes, and takes up further the microscopic examination of the solid material, the determination of ash, sand content, etc. In the second part one table is included.

Iodometric Evaluation in Case of Oxidative Degradation of Starch

Dr. R. Haller, J. Hackel, u. M. Frankfurt; Mell. Textil-Ber. 9, 757 (1928).—A brief discussion and table of results.

Wetting-Out Agents

Dr. Albert Landolt; Mell. Textil-Ber. 9, 759 (1928).—A highly technical discussion of the subject, with four figures, two tables and two graphs included. Valuable lists of the substances which have proved useful as the basis for wetting-out agents are given, and the information regarding the active constituents of several commercial preparations which pass under various names is not the least valuable part of the paper.

Water Resistant Fibers from Viscose

Austrian Patent No. 109,150.—The present procedure is characterized essentially by the presence, in the viscose mass, of compounds which react with organic acids in the spinning bath, with the formation of insoluble, waterproof substances. The formation of the fiber takes place in the presence of salts or other compounds which are contained in the viscose mass, while organic acids, etc., are present in the bath, not in the viscose mass, and react upon each other during the spinning to produce the water-proofing substances. This order may be inverted. The process of spinning the fiber is favored by the formation, at the same time, of these substances, which themselves are of a plastic nature, in respect to speed of formation of the fiber, solidity of consistency, etc.

Such compounds are added to the viscose mass as are of basic or salt-like nature, provided that they can be dissolved in the viscose mass; and the spinning bath contains, beside the precipitating acids, organic acids or compounds which react with the added compounds of the viscose mass to form insoluble or difficulty soluble, water resistant compounds. Salts of aluminium, e. g., the chloride, sulphate, acetate, etc., or similar salts of calcium, barium, strontium, tin, zinc, etc., are used, singly or in mixture. As acids one may use the higher fatty acids, such as palmitic, stearic, oleic, erucic, the sulphonated fatty acids, the sulphonated ricinoleic acids, hardened fatty acids, hydroxy fatty acids, halogenated fatty acids, the acids of waxes, aromatic acids, such as salicylic and tannic acids, which will form with the basic substances compounds of the properties desired, may also be employed. The viscose mass may also be treated with soaps, i. e., alkali salts or free acids, and spun into a bath which

contains the basic constituent of the desired compounds, whether or not in combination with an acid.

Example 1—Eight per cent cellulose in the form of viscose, 6.5% caustic soda liquor, and 0.5% of sodium aluminate, as a mass, are spun into a bath which contains 10 to 15% of sulphuric acid and 2.5% of a higher fatty acid.

Example 2—Viscose with 8% cellulose, 7% alkali, and 1.5% soap, is spun into a bath which contains about 20% of aluminium sulphate.

Oxides of Manganese as Reserves Under Vat Dyestuffs

H. Pomeranz; Mell. Textil-Ber. 9, 764 (1928).—A reminiscent discussion of the author's experience with Ludigol (m-nitro-benzene-sulphonate of sodium) employed as a manganese "Ludigolate."

A New Agent for Increasing Fastness to Light of Basic Dyestuffs

Dr. Paul Rabe; Melliand's Textil-Ber. 9, 665 (1928).—Auxanine B is a product introduced into commerce in September, 1927, as an agent for aftertreatment of fabrics dyed with basic dyestuffs. The author warmly commends it to the attention of dyers.

He speaks interestingly of the disappointing characteristics of the basic dyestuffs as a class: the purity and fullness of their tone, their brilliancy, as contrasted with their wretched fastness to light, and notes the fact that aftertreatment, as, for example, with copper sulphate, improves their fastness to light, at the cost of purity of tone. The new agent, Auxanine B, forms a violet-black, crystalline powder, which dissolves easily in water. It is of value chiefly for the improvement of light fastness of basic dyeings upon vegetable fibers—cotton, viscose, or cupro-ammonium silk—mordanted with Katanol or tannin, as well as upon unmordanted, unweighted silk. It is ingenuously stated that, for wool and for weighted silk, with basic dyestuffs, the substance is of no great use.

The dyeings are made in the usual manner, with tannin or Katanol as mordants, or without a mordant upon unweighted silk. After dyeing, the goods are well rinsed, and treated, in a fresh bath, at a 1-20 bath ratio, with 2 to 5% Auxanine B on the weight of the goods, the bath also containing 20 to 30 g. of common salt and the same amount of 1 to 10 acetic acid per liter. Treatment lasts ½ to ¾ hour at 25° to 30° C. If the common salt and acetic acid are omitted, three to four times as much Auxanine B will be needed to produce the same effect. The length of treatment spoken of is really requisite, so that piece goods are best treated in the jig rather than upon the Foulard. The goods are finally centrifuged without a previous rinse, and dried.

Usually a 2% Auxanine treatment is sufficient. Some basic dyestuffs are still more greatly increased in fastness to light, if the quantity of Auxanine is increased. Since the Auxanine in the first bath is not completely exhausted, standing baths may be used; in which case, for the next run, the amount of Auxanine added may be cut down by one-quarter to one-third.

A general table of dyestuffs, with which the new product gives excellent results, is here added:

Yellows—Citroflavine T and 8G, Methylene Yellow H, Rhoduline Yellow T, Thioflavine TCN and T.

Oranges—Rhodinduline Oranges, Flavophosphine.

Reds—Astra Phloxine FF Extra, Rhodamines, Rhodinduline, Reds, Safranines.

Violets—Astra Violet FF Extra, Brilliant Rhoduline Violet R, Crystal Violets, Methyl Violets, Methylene Violets, Rhoduline Heliotrope B, 3B, Tannin Heliotrope.

Blues—Fast Cotton Blues, Methylene Blues, New Blues, New Methylene Blues, Rhoduline Blues, Thionine Blue GO, Turkish Blues, Victoria Blues.

Greens—Brilliant Greens, China Greens, Diamond Greens, Malachite Greens, Methylene Greens.

Browns—Bismarck Browns, Vesuvines.

Grays—New Fast Gray.

An additional (the author takes it as the essential) value of the new product lies in the fact that, beside its property of increasing the fastness to light of the basic dyeings, the clear shade of the dyeings, which is really a characteristic criterion of the basic group, is in many cases, especially with the violets, blues and greens, only slightly lowered. An exception to this general property occurs with the Rhodamines, Astra Phoxine, and Astra Violet, which in their color tone are noticeably displaced toward the blue of the spectrum, but in other respects are but little affected in purity.

Measured by the standards of the E. K., the improvement in light fastness rises by three units, in some cases by four.

Colloid Chemical Studies of Cellulose—Part 1: Alkali Soluble Constituents and Their Determination

Dr. W. Weltzien; Seide 33, 261 (1928).—A seven-page paper, containing three tables, three graphs, and one full-page of photo-micrographs of treated and untreated cotton fibers.

Dyeing of Hydrone Blue with Sulphite and Bisulphite

Textil-Chem. u. Colorist 9, 87 (1928).—Justin-Mueller, in a sealed note of 1912 (Bull. Soc. Ind. de Mulhouse), notes that the classical method of dyeing, for the vat dyestuffs and for Hydrone Blue, is the sodium hydrosulphite method. For Hydrone Blue, the glucose sulphite and the sodium hydrosulphite methods are specially recommended. From repeated experiments, on the large as well as on the small scale, the author has found that sodium sulphide can be advantageously replaced by the sulphite or bisulphite of sodium, except when the goods are dyed by machine, by the circulation method. Good results are attained by use of 15 parts of Hydrone Blue 40% Paste, 35 parts of caustic soda solution of 40° B.,

30 parts of bisulphite liquor of 39° B., and five parts of hydrosulphite powder. The average temperature of the bath during dyeing should be 85° C.

Under these conditions this procedure makes it possible to use less hydrosulphite than by the sodium sulphide method, and the dyeings possess a blue tone more like that of Indigo, than do the dyeings obtained by other methods.

For the brightening of Hydrone Blue dyeings the same author (sealed note of 1912) finds that the sodium perborate commonly recommended for this purpose can be replaced by a treatment of the dyed material with a cold solution of 5% of sodium bisulphite of 39° B., for about 13 to 20 minutes (5% reckoned on the weight of goods). In the case of Hydrone Blue R, the hydrosulphite can be entirely omitted, and instead of it sodium sulphide can be used, with or without addition of alkali, at the boiling point or near to it. The goods are afterwards washed, and treated in the cold with bisulphite, as already described.

Example: The goods are dyed with 15% of Hydrone Blue R, 40% paste, plus 15% of sodium sulphide concentrated, at 90° C., for ¾ hour. The goods are then washed, and treated for 20 minutes with 5% of bisulphite of 39° B., aired, rinsed, and dried. Dyeing in this way allows a sulphur dyestuff to be used in conjunction with the Hydrone Blue, only addition of soda being then necessary.

As to the glucose-sulphite method, the author states that for several reasons it is desirable to encourage economy in the use of hydrosulphite. Although the sodium sulphide method gives good service, yet it has the disadvantage of requiring addition of hydrosulphite, especially toward the end of the dyeing operation. Glucose gives dyeings which are too dull. By combination of glucose with sodium sulphide, the author obtained very pure dyeings without aftertreatment, and in doing so made the interesting observation that the solution so prepared retained its dyeing properties completely, so that a standing bath could be employed.

Example: Ten per cent of Hydrone Blue 40% Paste, caustic soda liquor of 40° B., or 7% of soda, and 15% of sodium sulphide crystallized. The mixture is brought to a boil, and 7% of glucose, previously dissolved in the necessary amount of water, is added. The goods are dyed at the boil or nearly at that point for ¾ hour.

After dyeing, the goods are well squeezed, yarns by wringing over the bath, piece goods by squeeze rolls, which are best made a part of the construction of the bath. Yarns or pieces should remain lying, covered with a cloth, upon a wooden flooring for several hours.

M. O. Michel, who reports (Bull. Soc. Ind. Mulh.) upon the above notes, has found by experiment that the dyeings obtained by the hydrosulphite, bisulphite, and caustic soda method are somewhat less intense in tone than those obtained by the ordinary method (sodium sulphide-hydrosulphite-caustic soda). This difference in the depth of tone remains even after soaping, and even in the presence of soda; the tone of the blue is more violet when bisulphite has been used. After dyeing, the further procedure consists generally in a treatment with perborate, to brighten the tone. Justin-Mueller recommended the use of bisulphite for this purpose. The result obtained by his method is good, but the tone obtained by aftertreatment with perborate is more clear and more violet. Cassella has recommended the use of bichromate and bisulphite in their bulletin on the Hydrone Blues (1911). With this combination the dyeings are faster to washing than is the case when bisulphite alone is used. Cassella appears also to have given information (1911) regarding the use of glucose and caustic soda when dyeing with Hydrone Blue.

It appears that caustic soda assists the reduction better than does sodium sulphide. The glucose method was first recommended from motives of economy, but is to-day no longer used.

Bronzy dyeings are a frequent trouble. The referee adds that Hydrone Blue is inclined to reduce easily, so that the necessity for a standing bath does not exist.

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